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A GRADED COURSE OF GEOGRAPHY

BOOK III—THIRD YEAR
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NORTH AMERICA, BRITISH ISLES

PART II
BRITISH ISLES

BY
E. S. PRICE

GEOGRAPHY MASTER, RUABON GRAMMAR SCHOOL
CHIEF EXAMINER IN GEOGRAPHY TO THE JOINT MATRICULATION BOARD

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GENERAL PREFACE

THE four books, of which the present volume is the third, form the basis of the four years' course in Geography which is in operation at one of the two schools receiving a special geography grant from the Board of Education.

In deciding to add yet another series of geography books to the number already available, the author was influenced partly by the opinions of inspectors and other experts who visited the school, and partly by the experience gained as lecturer on the teaching of geography at different summer schools, where manuscript copies of the work have been examined by hundreds of teachers.

The distinguishing features of the present course are:

(1) Educationally, geography is regarded as a practical science, therefore great prominence is given to individual work of a kind intended to stimulate the pupil's self-activity. The practical exercises have been framed to lead the pupil to discover and apply geographical laws and principles.

(2) The selection of descriptive matter, and the mode of presenting it, is entirely in the hands of the teacher, who is free to follow his own inclinations.

(3) The special educational value of geography in linking together other studies is recognised, and useful connections are established between the various subjects of the curriculum.

(4) The books cannot be used independently of the teacher. They are not text-books. The pupil's text-book is his own notebook.

The course is intended for pupils between 12 or 13 and 16 years of age, and covers the outlines of the geography of the world by a successive treatment of the continents, which are dealt with in the following order:

Book I.—South America.

Book II.—Australia and Africa.

Book III.—North America and the British Isles.

Book IV.—Eurasia and revision.

This order of treatment was chosen because

of the order in which the main principles of physical and human geography are emphasised. In the first year of the course the emphasis is laid upon climate and vegetation. In the second year the emphasis is upon land forms and the sculpturing agents. In the third year the emphasis is upon industries and trade. A simple geological map of the British Isles is introduced at this stage.

The principles established in the first year are reviewed and amplified as the course advances, and new topics are illustrated by examples drawn not only from the special regions which are under consideration, but also from regions already dealt with. Thus past work is constantly revised, and the pupil is led to realise that geographical principles are world-wide in their application, and this prepares him for the fourth year of the course, when he surveys the world with natural regions as units.

The success of the course depends largely upon the use which is made of local material. It cannot be too strongly urged that the pupil's mind should be brought into contact with actual facts. Direct observation of the physical conditions and human activities of the school district is essential for providing the imagination of the pupil with material for constructing pictures of conditions in other lands. These mental pictures should be expanded and corrected by means of pictures, lantern slides, and models.

The writer desires to record his great indebtedness to Prof. Fleure of the University of Wales, Aberystwyth, and to W. Hammond Robinson, Esq., M.A., Inspector to the C.W.B., for constant inspiration and encouragement.

In planning the present course, he has derived considerable help from the numerous geography books which have been published during recent years.

E. S. PRICE.

GRAMMAR SCHOOL,
RUABON.

PREFACE TO BOOK III

THIS book, which provides the basis for the work of the third year of the course, is divided into two parts, Part I dealing with North America and Part II with the British Isles.

The same order of treatment is followed as in the other books of the series, and particular care has been taken to arrange the work in such a way as to enable the pupil to discover the causes of, and the principles underlying, important geographical facts.

The exercises marked A, F, H, etc., should form part of the course to which each letter refers. Exercises prefixed by an asterisk are to be answered as a result of lessons given in class, or as a result of independent reading. In the latter case it is suggested that the teacher should draw up a list of the available books containing the information required for answering the questions; in the case of a book which is not well indexed, the chapter and page should be given as well as the title.

It is not suggested that all the exercises should be worked by every pupil who uses this book. As circumstances vary from school to school, the teacher concerned must decide which exercises, if any, are to be omitted. Care, however, must be taken that the omissions do not cause gaps which destroy the continuity of the course.

The pupil should be warned against believing that all that is required of him is to work the exercises correctly. The facts and principles established must be thoroughly understood and mastered as the work proceeds, for only in this way does he acquire the store of knowledge necessary for solving later exercises.

The hearty thanks of the author are again due to Mr. W. E. Whitehouse, M.Sc., of Aberystwyth University, for his valuable suggestions and for revising the manuscript.

E. S. PRICE.

GRAMMAR SCHOOL,
RUABON.
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A GRADED COURSE OF GEOGRAPHY

BOOK III

THIRD YEAR: PART II

CHAPTER X

POSITION, AREA, CONTINENTAL SHELF, TIDES

1. **T**URN the globe until you get as much land as possible into the same hemisphere. Compare the world position of the British Isles with that of New Zealand. Which of the two countries is better situated for world commerce? Describe the course of the great circle air route from Britain to (a) Japan, (b) Alaska.

2. Draw a full-page sketch map of Western Europe to show the British Isles and the European countries which border the North Sea and the English Channel. Find approximately, the greatest and least width of each of the above seas and mark the results upon your map.

3. What is the latitude of (a) Cape Wrath, (b) the Lizard? Calculate the distance between them, assuming that one degree of latitude is equal to 69 miles, and check your result by measurement.

4. What parts of the British Isles lie (a) north of latitude, 60° N., (b) south of latitude 50° N.?

In which wind belt do the British Isles lie?

5. Express graphically the following areas:

	sq. m.
England . . .	50,874
Wales . . .	7,466
Scotland . . .	30,405
Ireland . . .	32,586

6. Arrange the following islands in order of size and express graphically their relative areas: Great Britain, British Isles, New Zealand, Tasmania, Newfoundland,

Madagascar, New Guinea, Vancouver, Cuba, Jamaica.

7. Find the distance between (a) Bristol and London, (b) Liverpool and Hull, (c) Glasgow and Edinburgh, (d) Carlisle and Newcastle, (e) Chester and Cardiff, (f) Dublin and Westport, (g) Londonderry and Cork. Find also the distance from Birmingham to Liverpool, Hull, London, and Gloucester respectively.

Mark the position and name of each of the above towns and the distances measured upon an outline map of the British Isles.

8. Which town in Britain lies farthest from the sea? What is the distance? Name some

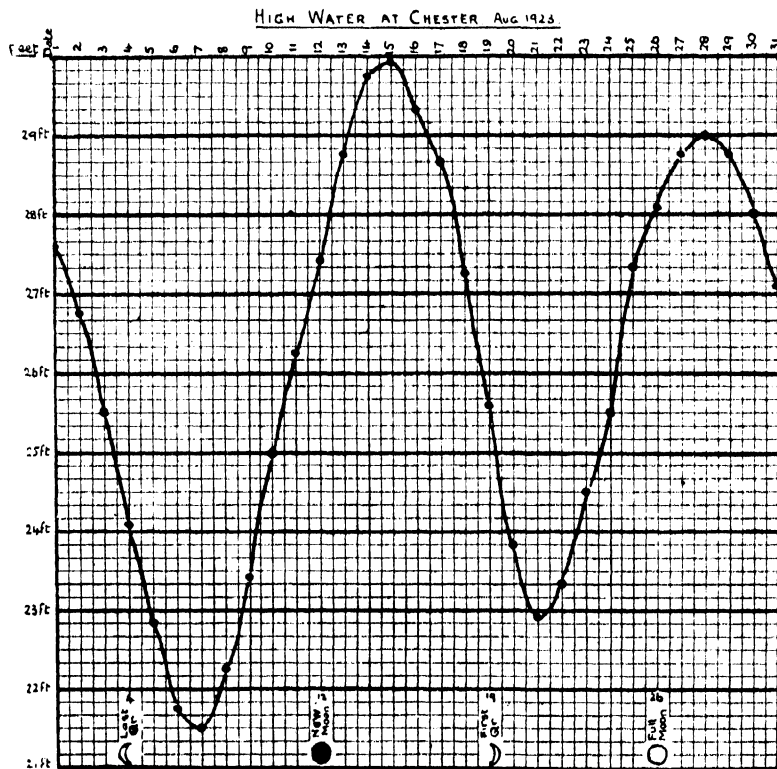


FIG. 82.

climatic and commercial benefits which result from the fact that no place in Britain is far from the coast.

9. Write short revision notes on the size, shape and position of the British Isles, pointing out how Britain has benefited from (a) its insular position, (b) its nearness to the countries of Western Europe, (c) its world position, (d) its position on the western rather than on the

12. The great importance of continental shelves as fishing grounds has already been discussed, but of even greater importance to Britain is the influence of the continental shelf upon tides. In the open ocean the tides are of no importance, and you might spend weeks at sea without knowing that there were tides, but along the coasts of Britain the tides are very noticeable and produce important results.

Twice a day, the sea advances and recedes. During each advance the lower courses of many of our rivers are converted into deep waterways enabling the largest vessels to enter and leave ports situated far from the open sea.

Fig. 82 was plotted from the figures given in the following table. Draw a similar curve to represent the height of water for one month at Liverpool. The necessary tables may be found in *Whitaker's Almanack*.

13. Examine Fig. 82 and the High Water Table at Chester and verify the following facts. (If your school is at the sea-side or near a tidal river the facts should be verified by direct observation.)

(a) The interval between two consecutive high tides is about 12 hr. 25 min.

(b) The height of high water is not constant, but increases and decreases regularly.

(c) The highest high tides occur shortly after the times of full and new moon and the lowest shortly after the quarters.

*14. Read the chapter on Tides in a text-book on physical geography and enter into your notebook the meaning of the following terms:

tidal wave, ebb-tide, flood-tide, spring-tide, neap-tide. Enter also simple explanations of the facts given in question 13.

15. Fig. 83 shows the hours of high water at different places in the British Isles on the same day (assuming that the tidal wave reaches the continental shelf at three o'clock). The curved lines are called **co-tidal** lines. Describe the progress of the tidal wave around our coasts.

*16. Discover the meaning of the terms "tidal race" and "bore" and describe the

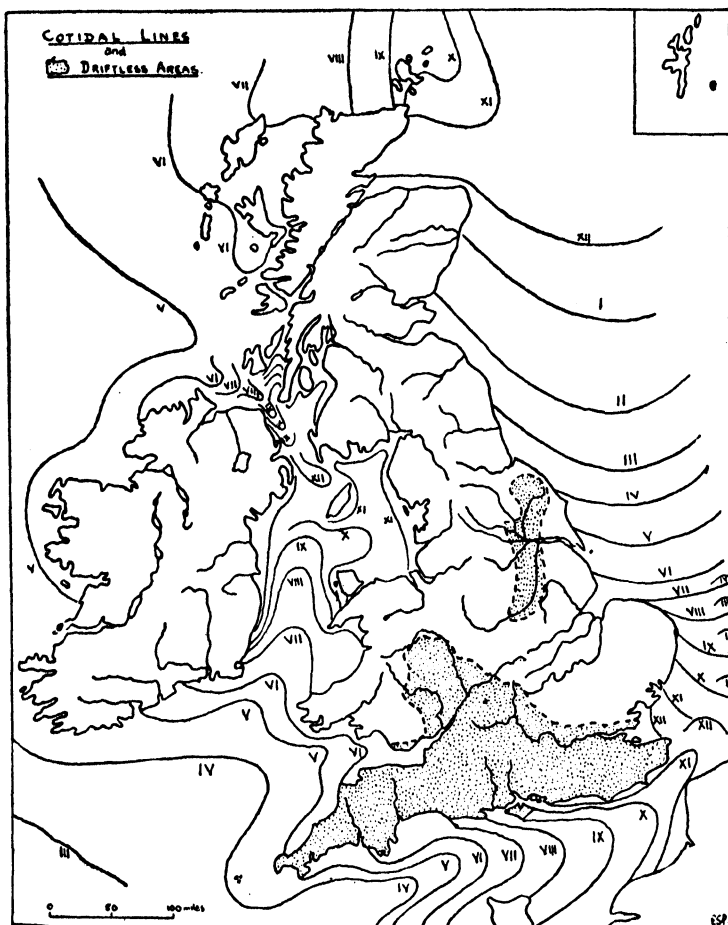


FIG. 83.

eastern margin of a continental land mass in the westerly wind-belt.

H. 10. "The most important fact in the history of Britain is her geographical position." Write an essay on this subject.

11. Examine the bathy-orographical map of Europe in your atlas. Where is the Continental Shelf of North-Western Europe widest? How far does it extend westwards beyond (a) Land's End, (b) Valentia Island? What is the Dogger Bank? Describe its position.

HIGH WATER AT CHESTER (Aug. 1923)

Phases of the Moon

 Last Quarter
New Moon

 Aug. 4
Aug. 12

 First Quarter
Full Moon

 Aug. 19
Aug. 26

Date.	Morning.		Afternoon.		Date.	Morning.		Afternoon.	
	Time.	Height.	Time.	Height.		Time.	Height.	Time.	Height.
	Hr. Min.	Ft. Ins.	Hr. Min.	Ft. Ins.		Hr. Min.	Ft. Ins.	Hr. Min.	Ft. Ins.
1	3 39	27 7	3 55	26 0	16	3 26	29 4	3 47	28 8
2	4 17	26 9	4 35	25 1	17	4 8	28 8	4 30	27 6
3	4 53	25 6	5 10	24 0	18	4 56	27 3	5 21	26 3
4	5 32	24 1	5 55	22 10	19	5 48	25 7	6 18	24 7
5	6 20	22 10	6 51	21 9	20	6 55	23 10	7 31	23 5
6	7 21	21 9	7 56	21 2	21	8 10	22 11	8 50	23 4
7	8 33	21 6	9 9	21 9	22	9 31	23 4	10 9	24 5
8	9 44	22 3	10 17	22 7	23	10 42	24 6	11 12	26 0
9	10 47	23 5	11 13	24 2	24	11 40	25 6	—	—
10	11 38	25 0	11 59	26 2	25	12 3	27 4	12 27	26 5
11	—	—	12 22	26 3	26	12 48	28 1	1 8	27 2
12	12 43	27 5	1 4	27 5	27	1 26	28 9	1 46	27 9
13	1 24	28 9	1 45	28 7	28	2 5	29 0	2 22	27 11
14	2 4	29 9	2 26	29 5	29	2 40	28 9	2 53	27 8
15	2 46	29 11	3 4	29 4	30	3 10	28 0	3 26	26 8
					31	3 42	27 1	3 59	25 9

conditions necessary for their formation. Illustrate your answer by examples drawn from the British Isles.

17. Examine Fig. 84 and explain why (a) Southampton has **double** tides, (b) the tides in the Bristol Channel are exceptionally high, (c) London has a **reinforced** tide.

18. How do the phenomena referred to in questions 16 and 17 affect navigation?

19. Read your answer to question 40, Chap. III, and explain how Chesil Bank, Spurn Head, and Dungeness were probably formed.

F. 20. Translate:

L'extraordinaire richesse en ports qui distingue la Grande-Bretagne est surtout un effet des marées. C'est grâce à ce phénomène que l'on voit des cours d'eau médiocres et même insignifiants se transformer dans leur partie inférieure en véritables bras de mer. Coulant généralement d'un cours paisible et égal le

long de pentes peu inclinées, les rivières anglaises charrient peu d'alluvions, ce qui permet aux marées de débayer leurs embouchures et de pénétrer fort avant dans leur lit. Ainsi la zone ouverte à la navigation maritime n'est pas bornée à la côte proprement dite : elle s'accroît de toute l'étendue qu'embrasse dans l'intérieur la visite périodique du flot.

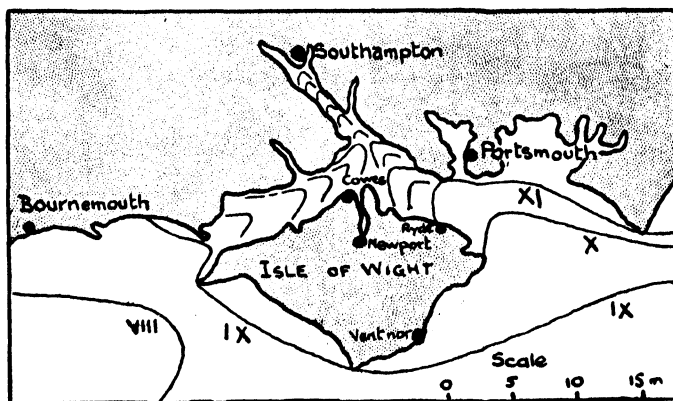


FIG. 84.

CHAPTER XI

STRUCTURE, RELIEF, DRAINAGE

1. **Y**OU have learned that the surface features of your school district have been determined by (a) the kind of rocks, (b) the structure, (c) external forces (weather, etc.). These factors determine

relief features of your school district. Illustrate your answer by block diagrams of the district. (See Fig. 85.)

*2. Read the chapter on the "Earth's Crust" in a textbook on physical geography and explain (a) the difference between igneous and sedimentary rocks, (b) how metamorphic rocks are formed. Describe how limestone, chalk, and coal were formed.

*3. Explain, with diagrams, the meaning of the terms "outcrop," "dip," "strike," "escarpment."

4. You learnt in Book II how sedimentary rocks are formed. The processes there described have been repeated several times during the earth's history, with the result that the crust of the earth is composed of igneous, sedimentary, and metamorphic rocks of different ages. The following table of rocks

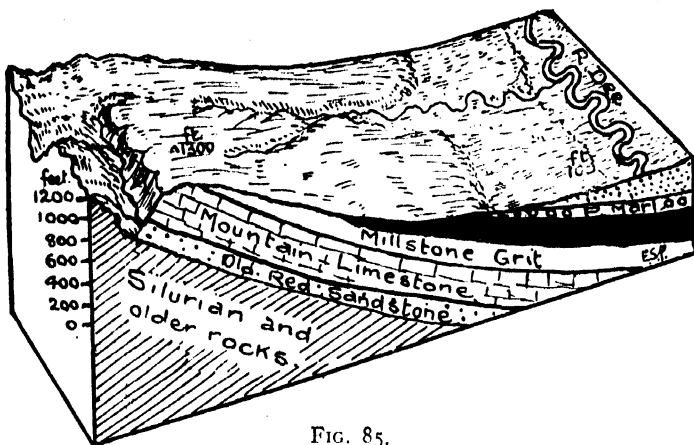


FIG. 85.

the surface features everywhere, and we shall now try to learn more about them.

Revise Chap. IV, Book II, and describe the influence of the rocks and structure upon the

is inserted for purposes of reference only. Examine the rocks of your own district and of districts visited by you, and verify the facts contained in column 2 of the table. Notice

Name.	Land Forms.	Examples.
Alluvium	Coastal plains, flood plains	Fens, Vale of York
London Clay	Lowlands	London Basin
Chalk	Undulating downs	South Downs
Gault	Clay lowlands	South of the North Downs
Lower Greensand	Sandstone ridges	In the Wealden Area
Wealden Sands	Uplands and ridges	Ashdown Forest
Oxford Clay	Lowlands	Upper Thames Vale
Oolitic Limestone	Scarped ridge	Cotswold Hills
New Red Marl	Plains	Cheshire Plain
New Red Sandstone	Uplands rising out of marl plains	Cheshire Hills
Coal Measures	On the margins of uplands	Ruabon District
Millstone Grit	Uplands	Ruabon Mountain
Carboniferous Limestone . .	Uplands and plains	Pennines : Central Ireland
Old Red Sandstone	Uplands and plains	Brecon Mts. : Hereford Plain
Silurian and Cambrian . . .	Slates and hard shales of mountains and uplands	North Wales : Southern Uplands : Lake District
Pre-Cambrian	Highlands of schists, gneiss	Highlands of Scotland
Igneous	Uplands of granite, basalt	Cheviot Hills : Antrim Plateau

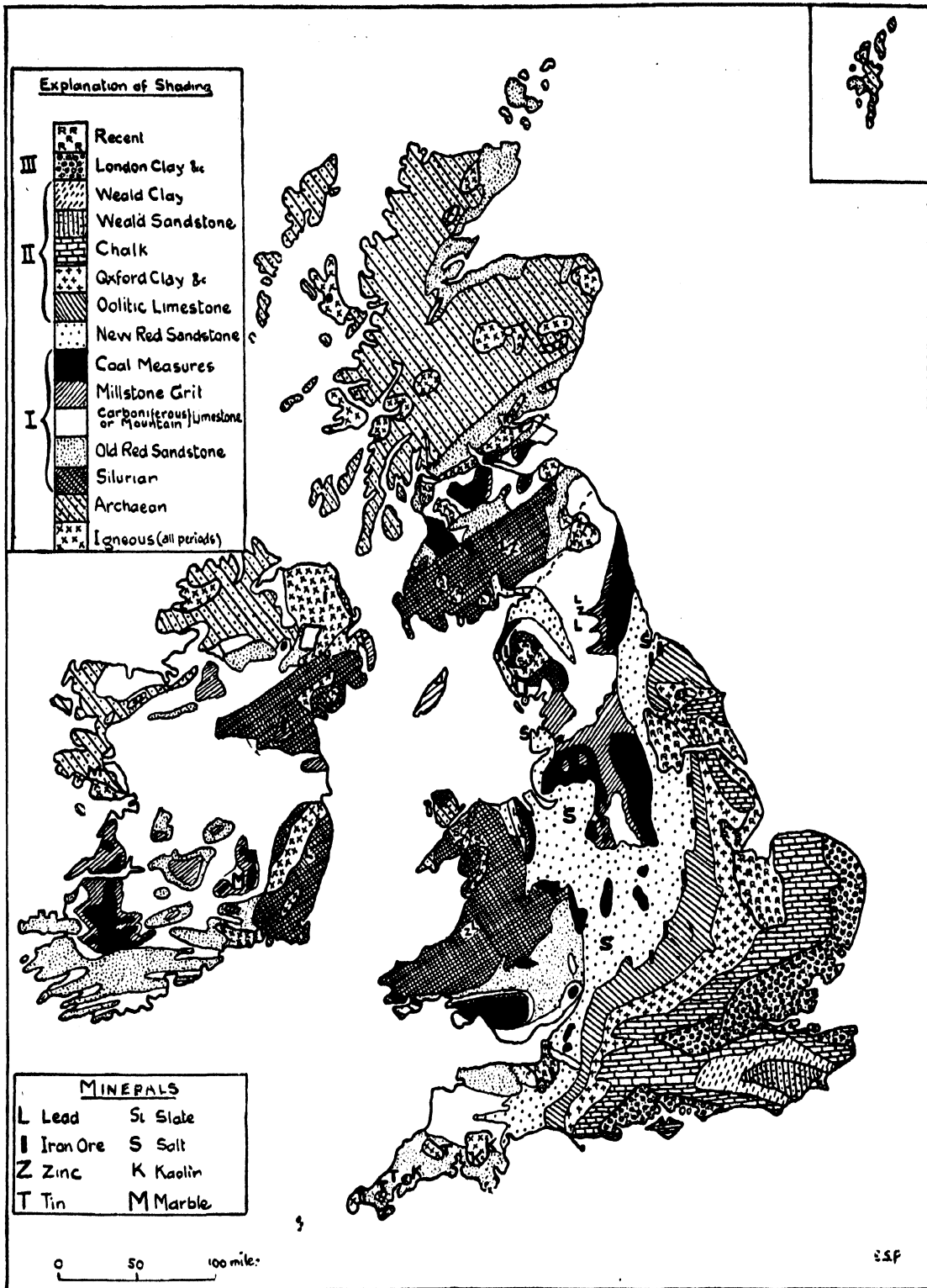


FIG. 86.

also to what extent the rocks affect the occupations and distribution of population in the districts named.

5. Revise the first part of Chap. III. Examine Fig. 83, and name the parts of the British Isles



FIG. 87.

which were not affected by the ice-sheet, and which are therefore driftless areas.

6. Examine the relief map in your atlas. Notice the position and extent of the uplands and lowlands. Draw full-page maps of (a) England and Wales, (b) Scotland, (c) Ireland. Shade, in pencil, land over 600 ft. high and enter the names of the chief uplands in red ink and of the lowlands in black ink.

7. Colour red all the igneous and old (archæan and primary) rocks shown on the geological map (Fig. 86), and draw up a two-column table giving the names of the uplands which are composed of old and young rocks respectively. State the conclusions you arrive at from an examination of your table.

8. "Old rocks form highlands and young rocks form lowlands." Is this statement true? Give examples to support your answer. How does your answer prove that the surface features of a country are not solely determined by the kind of rocks?

9. Read the answer given below to the following question: "Describe the general distribution of highlands and lowlands in Ireland."

"Generally speaking, the highlands of Ireland are to be found in the north and south. The centre of the country is occupied by lowlands. The highlands of the north are not continuous, but form isolated masses separated by belts of lowlands. The highest mass of this region is in the north-west, where the land rises to over 2,000 ft. The highlands of the south, like those

of the north, extend across the country from east to west, and consist of isolated masses separated by lowlands. The southern highlands are higher than those of the north, and in the extreme east and west rise to over 3,000 ft. The central plain stretches across the country from sea to sea. It is interrupted in the west by isolated highland masses, which contain peaks over 2,500 ft. high.

The above answer, although accurate, illustrates a common fault which you must guard against. You will have noticed that no names are given. The names of the most important features should have been included in the answer.

10. Rewrite the above answer, inserting the names of the chief topographical features. Illustrate the answer by a diagram or a simplified sketch map (Fig. 116).

11. With the help of your atlas write similar descriptions of the distribution of highlands and lowlands in (a) England and Wales, and (b) Scotland.

12. We shall now consider the physical features of the British Isles in some detail. It is to be understood that a good atlas is indispensable, and that the bare outlines which follow should be supplemented by the study of pictures and the reading of passages descriptive of the regions under consideration.

Scotland may be divided into three physical



FIG. 88.

Mountains, flow in an easterly direction. The Highlands are noted for their beautiful scenery, and the regions round Oban, Loch Lomond, and Loch Katrine are visited annually by thousands of tourists. Loch Katrine in the Trossachs provides Glasgow with its water-supply.

The Highlands of Scotland. The Highlands are divided into two parts by the narrow rift valley of Glenmore, the northern part being called the Northern Highlands, and southern the Grampian Highlands. The Northern Highlands are the remains of an uplifted peneplain of very ancient rocks. The uplifted block was tilted towards the east so that the east coast from Duncansby Head to the Southern Shores of Moray Firth is bordered by lowlands. The Northern Highlands have been deeply trenched by rivers, and there are but few large areas of high ground remaining. Evidences of ice action are abundant everywhere in the form of corries, hanging valleys, U-shaped valleys, rock basin lakes, moraine-dammed lakes, etc. On the west the region has undergone extensive subsidence, and the sea has penetrated far up the glaciated valleys, forming typical fiords (Fig. 89).

of recent volcanic rocks. The small island of Staffa is famous for its cave, the roof of which is supported by remarkable examples of lava columns. The Orkney Islands are formed of old red sandstone, and are detached portions of the neighbouring mainland.

13. Draw a sketch map of the Northern Highlands. Shade the Highlands lightly in pencil and mark in ink (a) all the names contained in question 12; (b) Cape Wrath, Buchan Ness; (c) Pentland Firth, Firth of Lorne, the Minch, Loch Carron; (d) Harris and Lewis, Iona,



Islay, Jura; (e) Lochs Shin, Morar, Maree, Ness, Awe, Tay; (f) the passes of Glencoe, Killiecrankie, and Drumochter.

14. Draw sections across Fig. 88 from A to B, and from C to D. Describe the characteristics of the fiords of Scotland both above and below sea-level.

15. What are the chief differences between the east and west coasts of the Highlands of Scotland? Account for these differences.

16. Describe the chief railway routes of the Highlands (Fig. 89). Refer to your atlas and

northern part of the Central Lowlands is a narrow fertile plain of old red sandstone, the eastern part of which is called Strathmore. The Carse of Gowrie, which lies between the Sidlaw Hills and the Firth of Tay, is formed of the same rocks.

In the southern part of the Central Lowlands carboniferous rocks predominate. Slight foldings have formed basins in which the coal measures have been partly preserved (Fig. 87). Higher ground divides this region into three basins: the Ayrshire basin and the lower basins of the Clyde and Forth. The

Pentland Hills, partly formed of volcanic rocks, lie to the south of Edinburgh. From the plain rise isolated volcanic rocks such as Arthur's Seat, near Edinburgh, Bass Rock, and the heights upon which stand Dumbarton, Stirling, and Edinburgh castles. The Clyde is the only river of the Central Lowlands rising in the Southern Uplands.

Draw a sketch map of the Central Lowlands. Mark upon it (a) the names contained in the above summary, (b) The Trossachs, Kintyre Peninsula, Mull of Kintyre, Fife Ness, the rivers Earn and Ayr, the islands of Arran and Bute, (c) the chief railway routes (Fig. 90).

19. What are the Links of Forth? Explain why Stirling and Perth have been called the Keys to the Highlands. Explain the importance of the positions of Glasgow and of Dundee.

20. **Southern Uplands.** The Southern Uplands are residual

mountains carved from an uplifted peneplain of old rocks, chiefly slates and gritty shales. The hills are lower and rounder and the valleys are wider than in the Highlands, and nowhere does the land reach 3,000 ft. above sea-level. The original tilt of the land was to the south-east, and this partly accounts for the lowlands of Dumfries and Galloway. The tilt is also responsible for the direction followed by most of the rivers, for example, the Gala, which separates the Lammermuir Hills from the Muirfoot Hills, the Nith, which has carved its valley across the whole belt of the uplands, the Annan, and the Esk. The Tweed and its

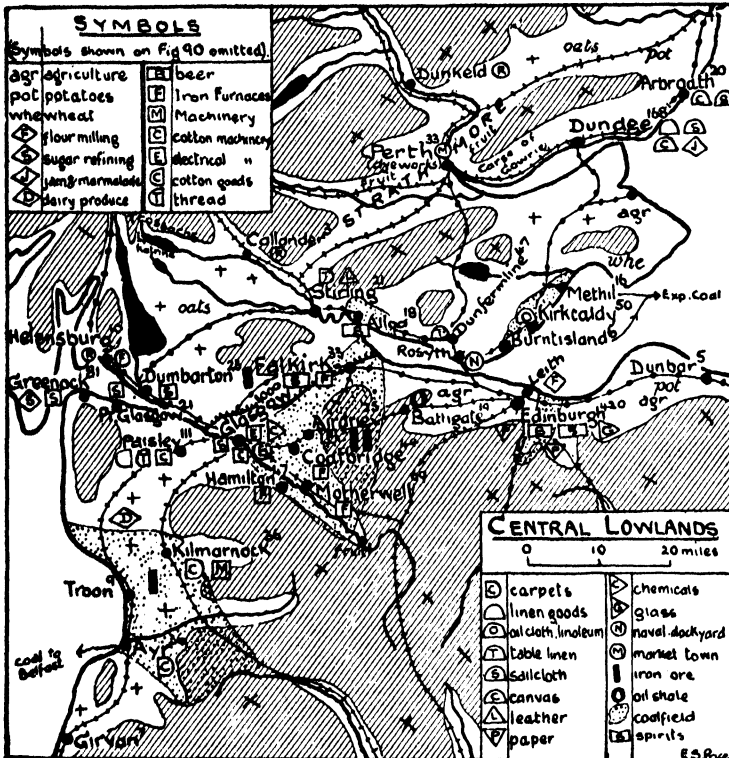


FIG. 90.

point out how they have been affected by the topographical features. Insert these routes upon your sketch map of the Highlands.

17. Account for the importance of the positions of Inverness and of Aberdeen. Illustrate your answer by means of a diagram or sketch map.

18. **Central Lowlands.** The Central Lowlands are divided into two parts by a line of volcanic hills running parallel with the **Highland Line**. These hills, called the Renfrew Heights, Campsie Fell, Ochil Hills, and Sidlaw Hills, are separated by water-gaps formed by the Clyde, Forth, and Tay respectively. The

tributaries Yarrow, Ettrick, and Teviot have cut their valleys along the outcrops of relatively softer rocks, dividing the eastern section

to over 2,760 ft. in the igneous dome of Cheviot Peak, and are drained by the Liddel, the North Tyne, and other rivers. The Pennines are broad,

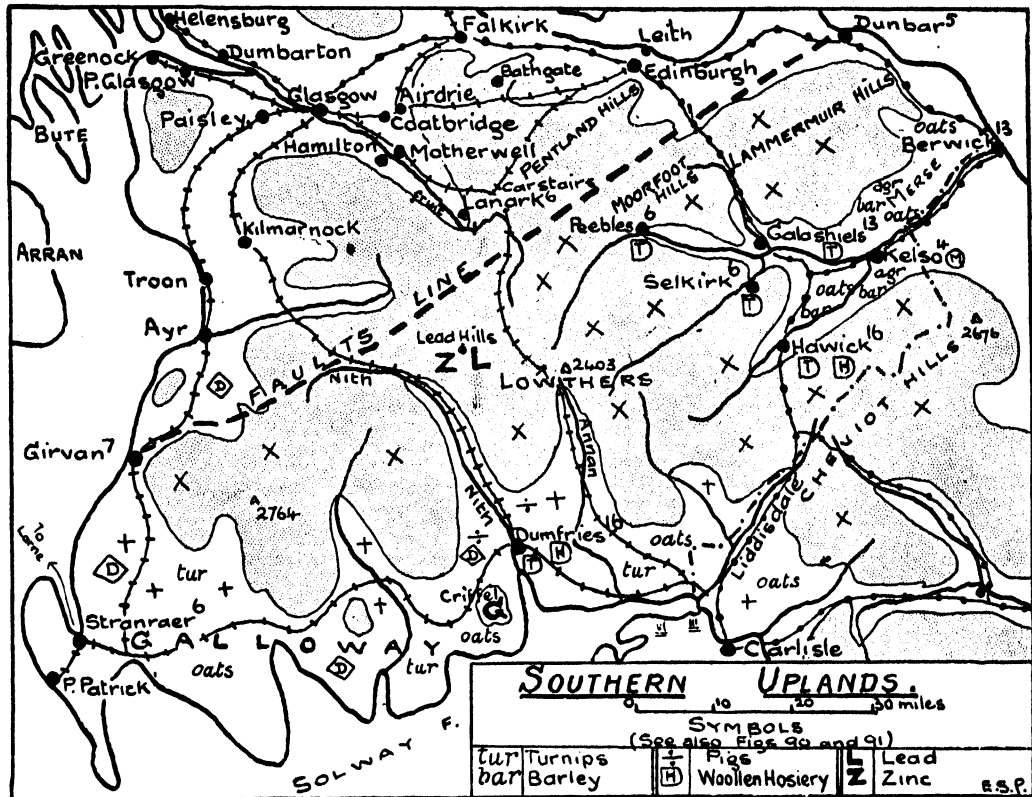


FIG. 91.

of the Uplands into a series of parallel ridges and valleys.

Draw a sketch map of the Southern Uplands and mark upon it (a) the names included in the above summary; (b) St. Abb's Head, Loch Ryan, the Upper Clyde, and Liddel Water; (c) the chief railway routes from England to the Central Lowlands.

21. Describe, with sketch map, the course of the river Clyde.

22. State briefly how the relief features have affected the direction of the railway routes from Carlisle to (a) Edinburgh, (b) Glasgow (Fig. 91).

23. Account for the importance of the positions of Edinburgh and of Galashiels.

24. **Cheviot Hills and Pennines.** A belt of high land extending from the Southern Uplands to the Cheviot Hills, separates the Solway Plain from the Tweed basin. The Cheviot Hills rise

undulating uplands due to an upfolding of carboniferous rocks (Fig. 92). As the fold was being formed the coal measures and most of the millstone grit were removed from the top of the

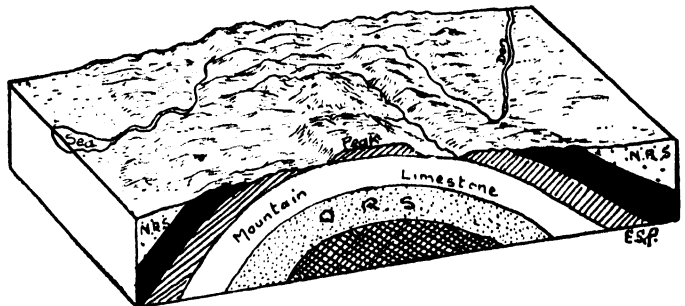


FIG 92.

fold, so that the surface is now mostly formed of carboniferous limestone. In the north-west the fold was broken, and the steep escarpment of the fault, above which towers Cross Fell

(2,892 ft.), overlooks the fertile valley of the Eden (Fig. 93).

The Pennines, whose average height is about 1,200 ft., descend to below 600 ft. in the Aire

which has been carved by erosion out of a dome of hard volcanic and slaty rocks. The deep valleys and the intervening ridges radiate outwards in all directions from a line running roughly between Scatell and Helvellyn. To the north of this line, and west of Skiddaw, lie Derwentwater and Bassenthwaite Water. Windermere, the largest of the many lakes of the district, lies to the south. Thirlmere supplies Manchester with water.

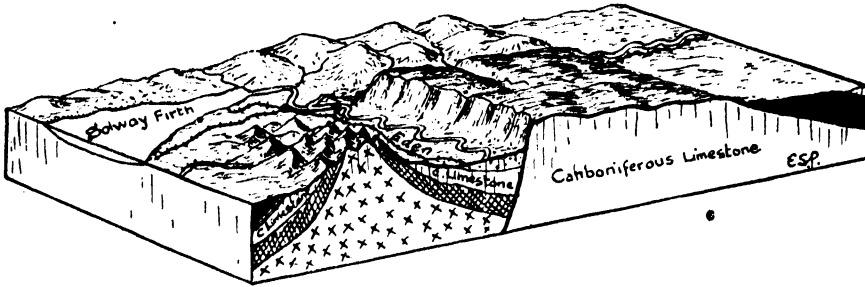


FIG. 93.

Gap. The main divide and the greatest heights are in the west. Wharfedale, Ingleborough, Pen-y-ghent, and the Peak are flat slabs of millstone grit resting upon the limestone base of the uplands. The longest rivers flow eastwards: the most important are (a) the Tyne, Wear, and Tees, which flow independently into the North Sea, (b) the Ouse and its tributaries Swale, Ure, Nidd, Wharfe, Aire, Calder, and Don which unite to form the Humber. In the Peak district the valleys of the Upper Trent, Dove and Derwent open out to the south. The chief rivers on the west are the Lune, Ribble, and Mersey.

Midway between the Tyne and Aire gaps, a belt of high land, called Shap Fell, extends to the Lake District. Elsewhere the Pennines are surrounded by plains of soft sandstones and clays.

Draw a full-page sketch map of the Pennines. Mark upon it (a) the names contained in the above passage; (b) the chief railway routes; (c) the position of the watershed (Figs. 94, 95, 96, and 107).

*25. Describe the scenery of the Pennine Uplands and account for the caves, sink-holes, and underground rivers of the limestone regions.

26. With the help of sketch maps, show the importance of the positions of Newcastle and of Leeds.

27. The Lake District. The Cumbrian Mountains form a small broken highland district

The Lake District is surrounded by carboniferous limestone, with coal measures outcropping on the north-west. The lowlands on each side of the Solway Firth are formed of new red sandstone; similar rocks form the narrow coastal plain which extends from St. Bees Head to Walney Island.

The Isle of Man bears some resemblance to the Lake District, of which it is obviously a detached fragment. The structure of the north of the island is masked by a covering of thick deposits of boulder clay.

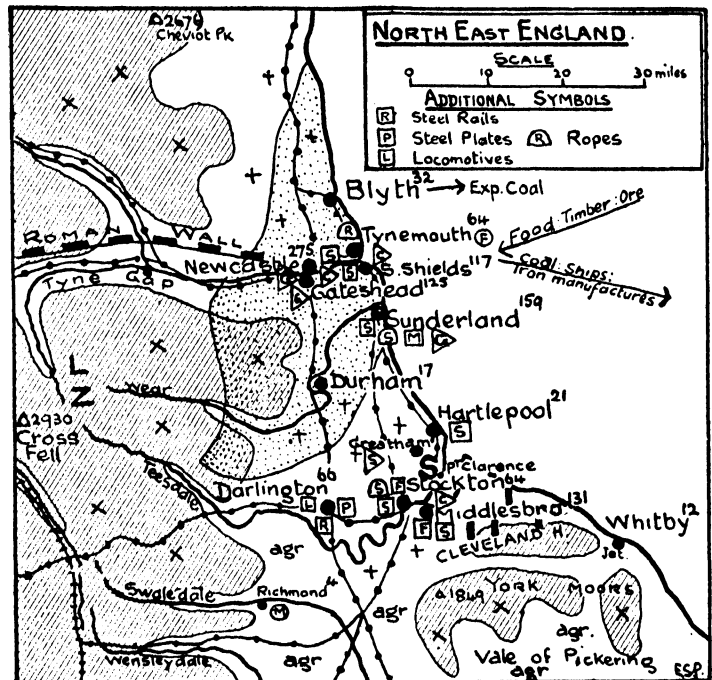


FIG. 94.

28. Derwentwater and Bassenthwaite Water were originally one lake. Examine Fig. 12 carefully and explain how the lake was divided.

29. Draw a sketch map of the Lake District and mark upon it (a) the names contained in the above passage, (b) the railway routes (Fig. 96).

30. From a study of a large scale-map of the Lake District state what evidences of ice action you would expect to find there if you visited that region.

31. Describe the importance of the positions of Carlisle and of Keswick.

32. **Wales.** Wales is a hill country dissected by deep valleys cut in old hard rocks. On the north and south it is fringed by coastal plains. The most rugged part of the country (where hard volcanic and slaty rocks prevail) lies to the west of the river Conway. This region, with its glaciated valleys, its cwms and its lakes, closely resembles the Lake District. Several peaks, including Snowdon, rise to over 3,000 ft. high. Llanberis, Ogwen, and Idwal are some of the best known lakes of the region. To the east of the ridge, which runs from Llyn Ogwen to the coast at Conway, is a plateau which contains several lakes. The largest of these lakes, Llyn Cowlyd, is used by the Dolgarrog water-power station as a storage basin. Anglesey and the extreme south of Llyn peninsula of Carnarvonshire are mostly lowlands covered with deposits of boulder clay. To the south and east of the Conway River the highlands are generally lower and rounder. Those parts which rise above 2,000 ft. are, however, more rugged, and probably, as in the Snowdon district, stood out above the peneplain before it was uplifted. Both in structure and relief this part of Wales closely resembles the Southern Uplands. The Berwyn Range, which traverses the country from Cardigan Bay to the Cheshire Plain, is a difficult barrier to cross. To the east of

Cader Idris it descends to 936 ft., but everywhere else it is well over 1,000 ft. The river Dee rises on the slopes of the Arenigs and enters Bala Lake. Emerging from the lake, it follows the foot of the Berwyn Range until it reaches the Cheshire Plain, where it turns north-

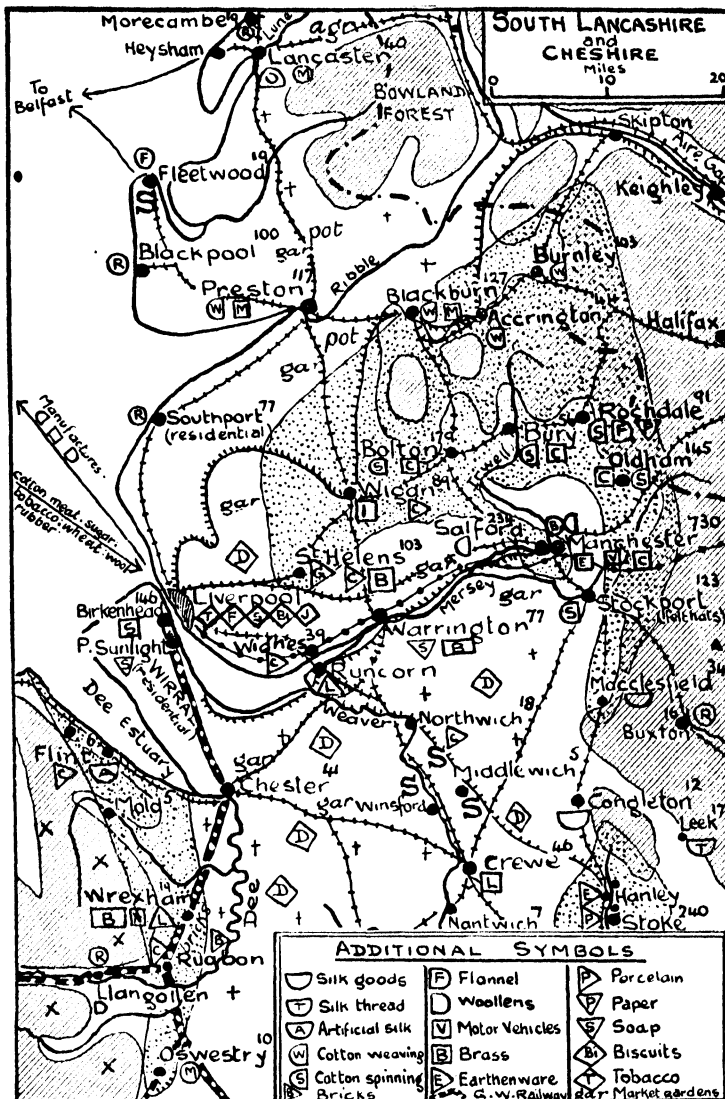


FIG. 95.

wards and follows a meandering course to its great estuary. The southern slopes of the Berwyn Range are drained by the Dovey and the Vyrnwy. The Clwyd Valley, separated from the Dee estuary by the Clwydian Range, closely resembles the Eden Valley, for both valleys are bounded by a steep scarp on the east, both open

northwards, and both have a floor of fertile New Red Sandstone rocks. The rivers Severn and Wye rise in Plynlimmon, one of the culminating peaks of the undulating uplands of Central Wales. The Rheidol, Ystwith, Elan, Teifi, and Towy rise in the same region. Lakes Vyrnwy and Elan supply water to Liverpool and Birmingham respectively.

South of the dissected block of Central Wales the trend of the relief features is from east to west. The Brecon Beacons, formed of Old

narrows westwards, and forms only a small belt in Pembrokeshire. The coastal plain of Glamorgan is formed of fertile young rocks.

Draw a full-page sketch map of Wales and mark on it (a) the names contained in the above passage; (b) Great Orme's Head, St. David's Head, Worm's Head, Menai Straits, Milford Haven, Carmarthen Bay; (c) the chief railway routes (Figs. 97 and 98).

33. State how the railway routes of Wales have been affected by the topographical features.

34. Account for the importance of the positions of Chester, Conway, and Bangor.

35. With the help of Fig. 85, describe the structure and relief of the Ruabon district.

36. **The South-West Peninsula.** The south-west of England is a peninsula composed for the most part of isolated uplands of old rocks surrounded by plains of younger rocks. The Mendip Hills are formed of carboniferous limestone. The Cheddar Gorge is probably due to the falling in of the roof of a series of caverns in the limestone. The alluvial plain of Somerset, drained by the Parret and other rivers, lies between the Mendip Hills and the Quantock and Blackdown Hills. Exmoor, which rises steeply from the Bristol Channel, is a plateau of Old Red Sandstone and limestone rocks. South of Exmoor is the fertile plain of Devon, drained by the Taw and Torridge to Barnstaple Bay and by the Exe to the English Channel. Dartmoor and Bodmin Moor are

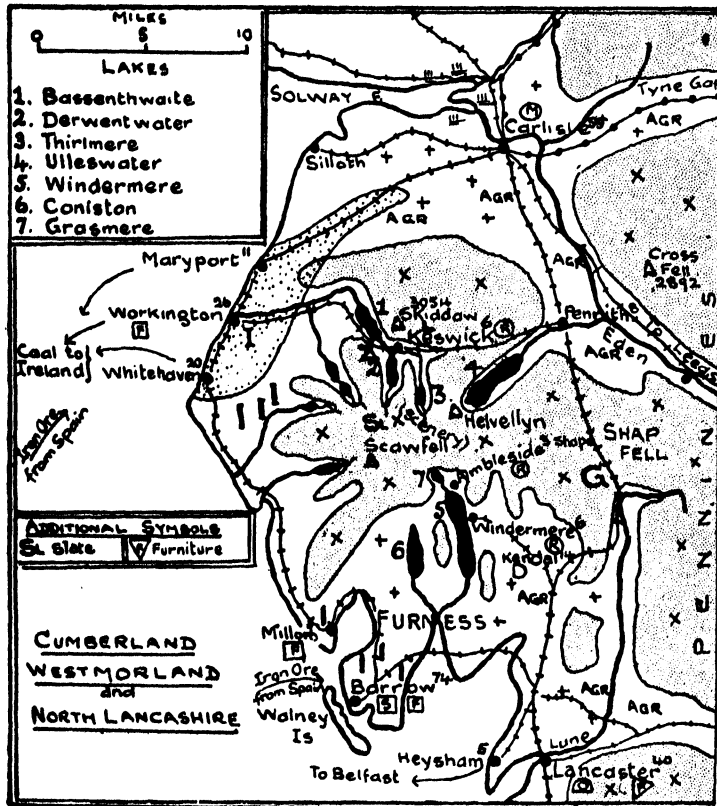
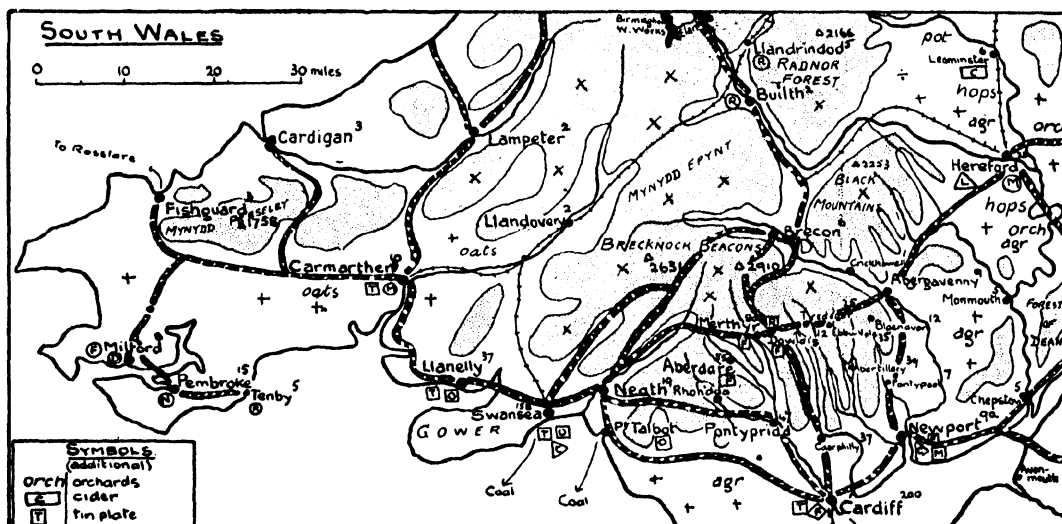
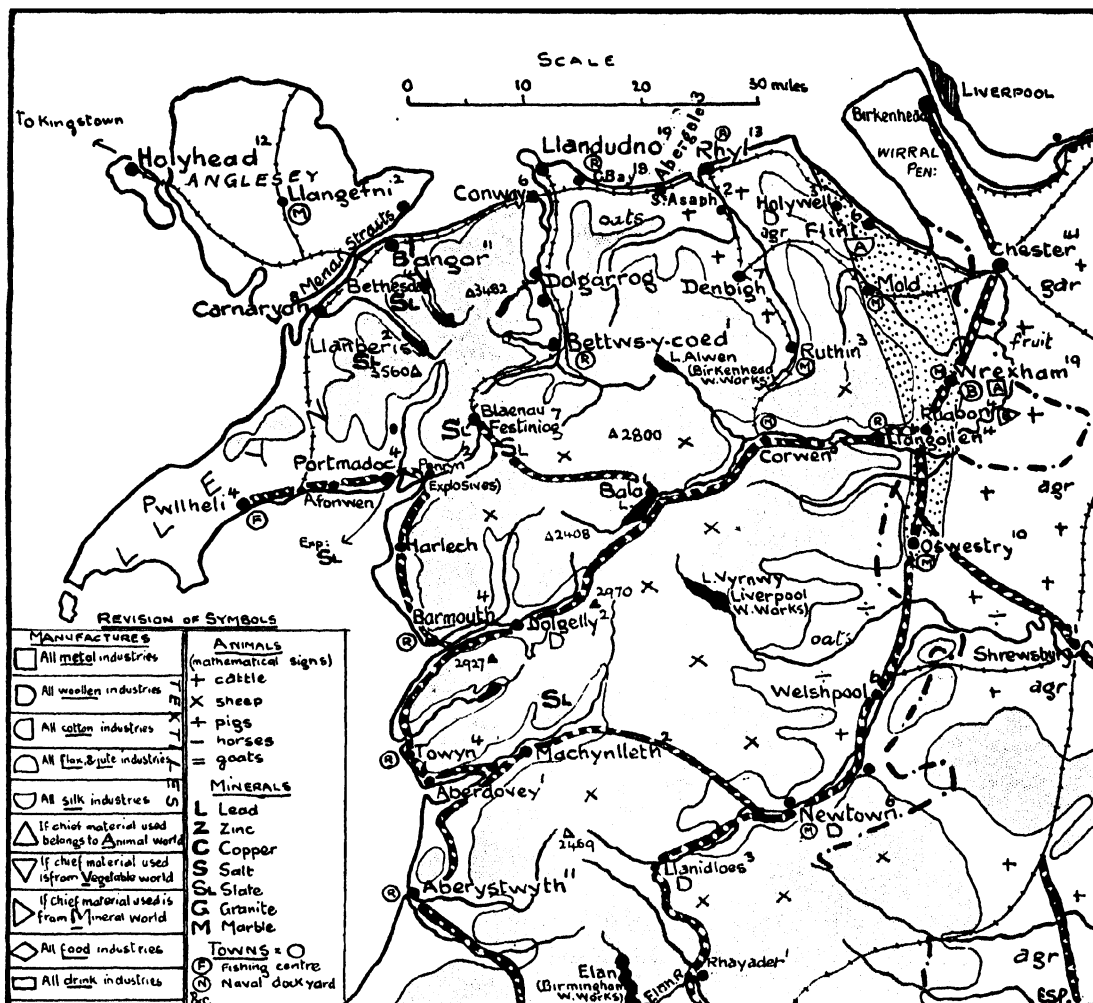


FIG. 96.

Red Sandstone, slope steeply northwards, but more gradually to the south. The same red sandstone rocks form the floor of the fertile lowlands of Hereford and Monmouth. The Black Mountains are separated from the mass of the Brecon Beacons by the deep valley of the Usk, and from the Radnor Forest by the Wye. South of the Brecon Beacons, and extending across South Wales from South Pembrokeshire to the west of Monmouthshire, carboniferous rocks predominate. These rocks were downfolded along an east-to-west axis, and the coal measures were preserved. The downfold

granite masses surrounded by fertile lowlands. The Tamar River rises not far from the west coast, and flows across the peninsula to the English Channel. The sinking of the land has submerged the lower valleys of the rivers, producing beautiful branching estuaries called **Sounds**. The Scilly Isles are detached portions of the peninsula.

Draw a sketch map of the peninsula and mark upon it (a) the names contained in the above summary; (b) Falmouth Harbour, Mount's Bay, Land's End, the Lizard; (c) the railway routes (Fig. 99).



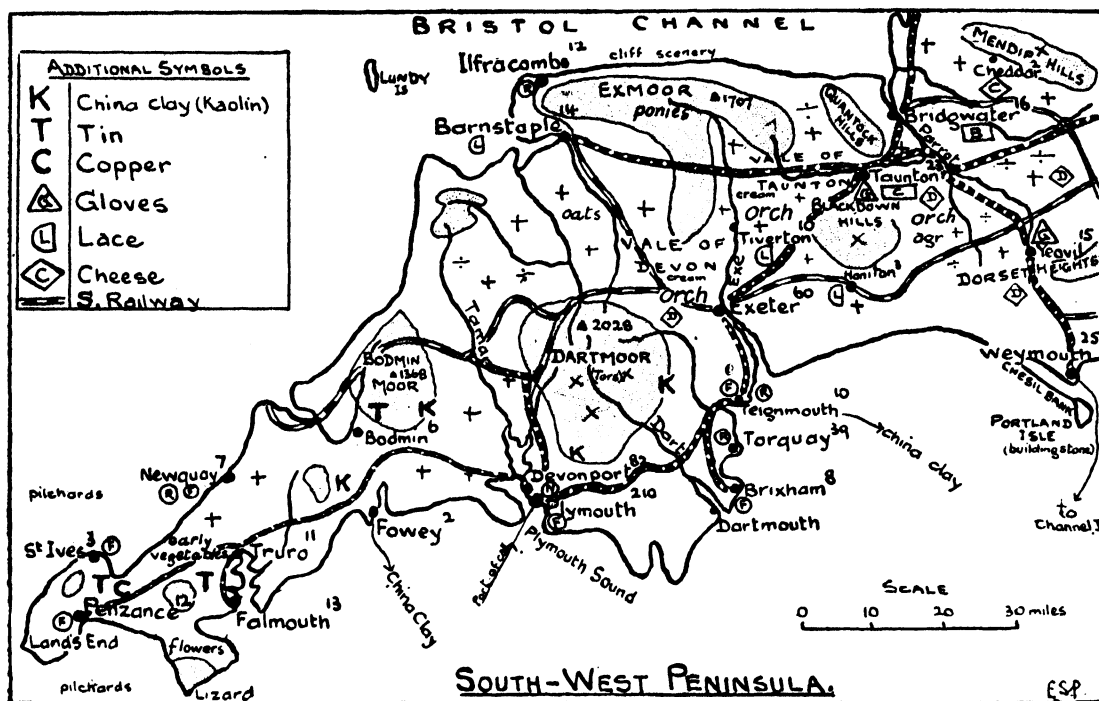


FIG. 99.

37. Describe and account for the nature of the coast of the south-west peninsula. clay rocks. The Lancashire and Cheshire Plain and the Vale of York are northern extensions

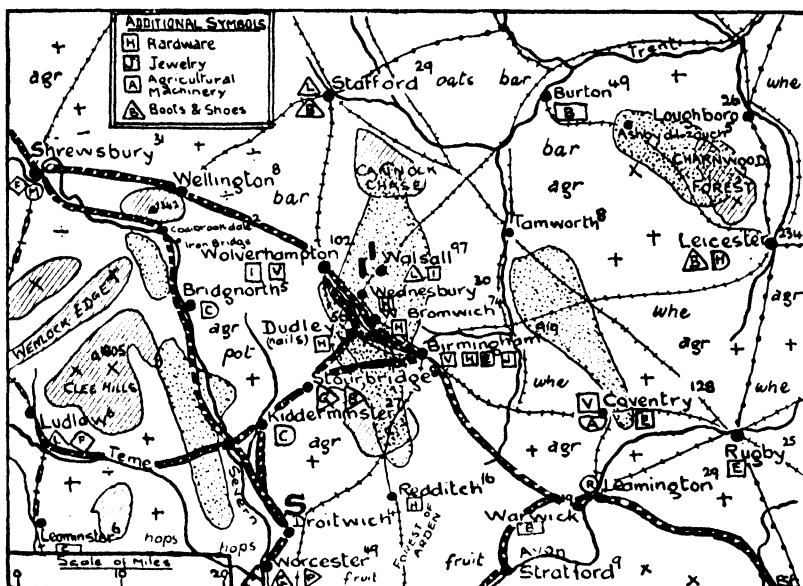


FIG. 100.

38. Describe the positions of Exeter, Plymouth, and Taunton.

39. **Midland Plain.** The centre of England is occupied by a fertile plain of sandstone and

of the Midland Plain. Another branch of the plain extends in a south-westerly direction to the Severn estuary. Although called a plain, the region is by no means flat. In some places,

as in Cheshire, the harder sandstones stand up as hills; in others, outliers of older rocks appear, as in the Wrekin, the Malvern Hills, and Charnwood Forest. For the most part, however, the land is a plain covered with glacial and alluvial deposits. Most of the streams which drain the region flow either to the Severn or to the Trent. The Weaver flows into the Mersey, whose bottle-necked estuary is separated from that of the Dee by the Wirral Peninsula.

Draw a sketch map of the area described

above and mark upon it (*a*) the names included in the passage; (*b*) the Midland Gate, Cannock Chase, the Cheshire Hills; (*c*) the chief railway routes (Fig. 100).

40. Describe with sketch map (*a*) the basin of the Severn, (*b*) the basin of the Trent, pointing out in each case the course of the main stream, the chief tributaries, and the nature of the country through which they flow.

41. Describe the importance of the positions of Shrewsbury, Gloucester, York, Nottingham, Derby, and Birmingham respectively.

CHAPTER XII

STRUCTURE, RELIEF, DRAINAGE (continued)

1. **SOUTH-EASTERN SCARPLANDS.** The area to the south-east of a line drawn from the coast of Dorset to the mouth of the Tees (Fig. 101) is composed of young rocks, and consists of

(1) A line of limestone uplands called the Oolitic Ridge, or "The Edge." It includes the Dorset Heights, Cotswold Hills, Edge Hill, Northampton Heights, Lincoln Edge, Yorkshire Moors, and Cleveland Hills.

(2) Four chalk ridges radiating from Salisbury Plain and Hampshire Downs, namely: (a) the Dorset Downs to the south-west; (b) the South Downs to the south-east; (c) the North Downs to the east; (d) the Marlborough Downs, Chiltern Hills, East Anglian Heights, Lincolnshire Wolds, and the Yorkshire Wolds to the north-west.

(3) Clay lowlands between (1) and (2) (d) above, namely: (a) the upper basin of the Bristol Avon; (b) the upper basin of the Thames; (c) the Wash basin; (d) the Vale of Lincoln; (e) the Vale of Pickering.

(4) The London Clay basin, extending from the north coast of Norfolk to the North Downs.

(5) The Hampshire clay basin, which lies to the south of Salisbury Plain and between the Dorset Downs and South Downs.

Copy Fig. 101 into your notebook.

2. Before proceeding with the study of the south-east of England, let us try and understand how scarplands are formed. Fig. 102 shows new land formed of an alternation of hard and soft layers, in which rivers from the old land are cutting their valleys.

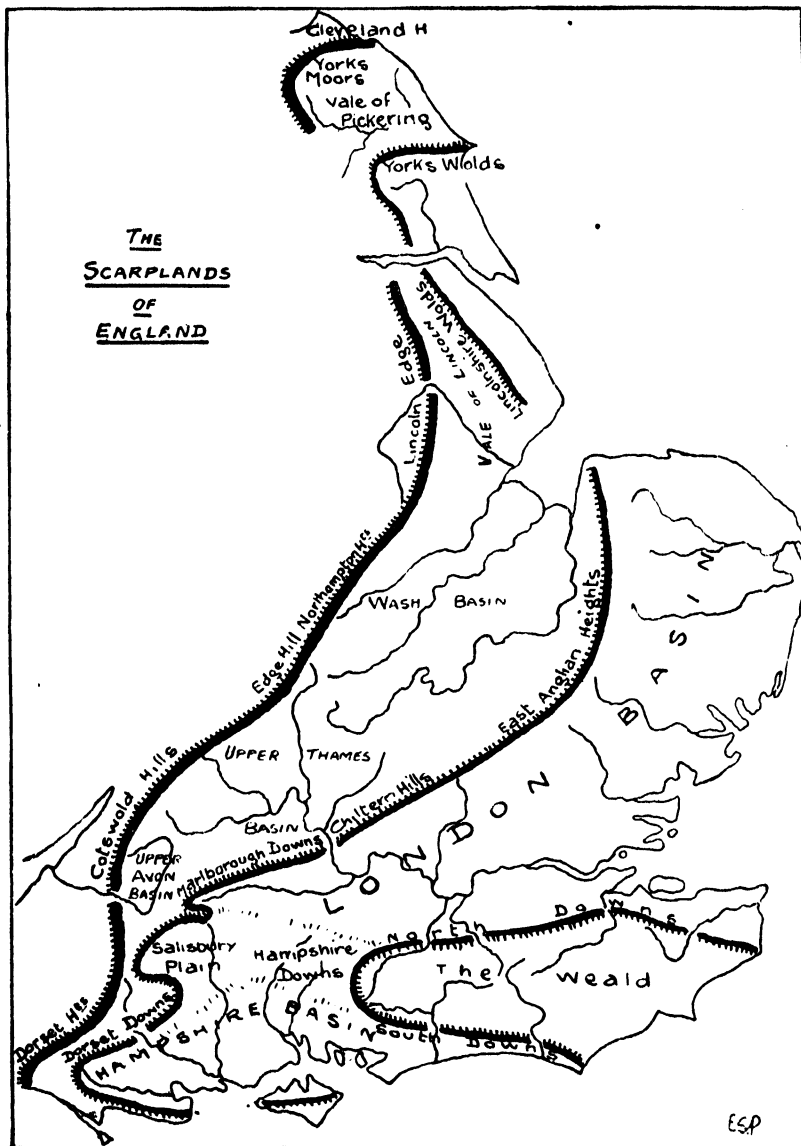


FIG 101.

The layers are not horizontal, but dip gently towards the sea. As those parts of the new land which are farthest from the coast are highest and were the first to be exposed, they

area flowed from the top of the fold either to the Thames or to the English Channel. The folding strained the chalk at the top of the fold, and this helped the forces of erosion to remove the chalk

FIG. 102.

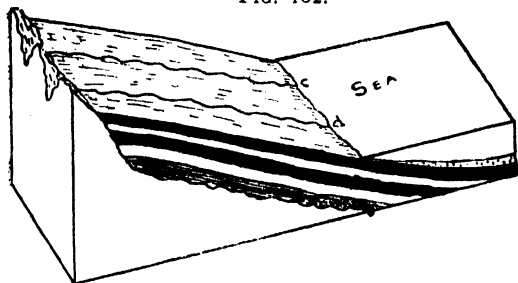


FIG. 103.

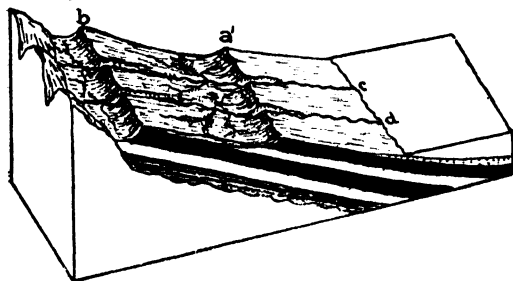
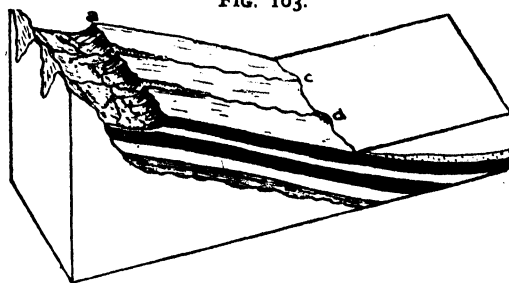


FIG. 104.

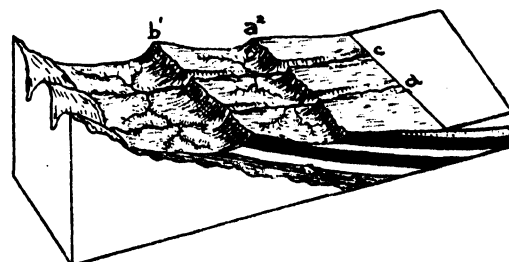


FIG. 105.

have suffered most from denudation. Fig. 102 shows that near the old land the rivers have cut through the chalk to the underlying clay. The lowering of the clay undermines the chalk resting upon it. Fig. 103 shows how the undermining of the chalk causes a scarp (*a*) to form. Denudation continues, and in time the underlying limestone is cut through. The undercutting of the limestone follows, and a limestone scarp, (*b*), forms (Fig. 104). In the meantime, the agents of denudation have continued to attack the chalk scarps, which, as a result, move farther and farther away from the old land (Fig. 105).

Fig. 105 also shows an example of river capture.

With the help of Fig. 105, draw a diagram to show the structure and relief of the south-east of England along a line drawn from Malvern to London.

3. Fig. 106 represents the relief and structure of part of the Wealden area. The chalk which covers the Hampshire Downs once extended farther east, where it was upfolded along an east-to-west axis. The original rivers of the

from the crest. Then the processes described in question 2 operated on each side of the original fold to produce the results shown in Fig. 106.

Describe carefully how the scarps, water gaps, and wind gaps of the North and South Downs were formed.

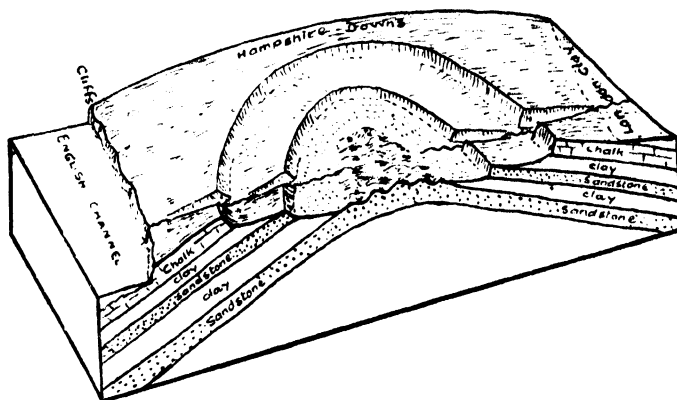


FIG. 106.

4. **Yorkshire Moors, Yorkshire Wolds, and Holderness.** The oolitic ridge attains its highest elevation in the Yorkshire Moors. These moors, whose steep northern face is called the Cleveland Hills, resemble the Pennine uplands. The

Yorkshire Wolds are chalk downs sloping steeply to the north and west. Both the Moors and the Wolds form high cliffs where they reach the North Sea coast. Between the two lies the fertile vale of Pickering, which is remarkable for being drained through a western outlet to the Ouse by the Derwent. The low peninsula of Holderness, whose coast is backed by low clay cliffs, is formed of silts, gravel, and boulder clay. The erosion of the coast produces the debris which tidal currents deposit farther south.

Lincolnshire the limestone and chalk uplands run from north to south, dividing the county into five belts: (a) the Lincoln Edge, lying between (b) the Midland Plain and (c) the Vale of Lincoln; (d) the Lincolnshire Wolds lying between the Vale of Lincoln and (e) the coastal plain. The river Witham rises on the western side of the Lincoln Edge, and, after flowing north for some distance, bends at right angles and passes through the Lincoln Gap. It then turns southwards and finally enters the Wash.

Probably the Upper Witham was originally a tributary of the Upper Trent, which flowed through the Lincoln Gap before the Lower Trent diverted its course to the Humber.

The Wash Basin lies between the Leicester and Northampton Uplands on the west and the East Anglian Heights on the east. It is separated from the Upper Thames Valley by a low divide which runs through Buckinghamshire. The Wash Basin is drained by the Welland, Nen, and Great Ouse, all of which rise in the limestone uplands. The lowest part of the basin is called the Fens. The Fens are tracts of marshy land which once extended as far inland as Cambridge, Huntingdon, Peterborough, and Lincoln; but, as in the case of Sedgemoor, much of the Fenland has been drained, and now forms some of the most fertile land in the country.

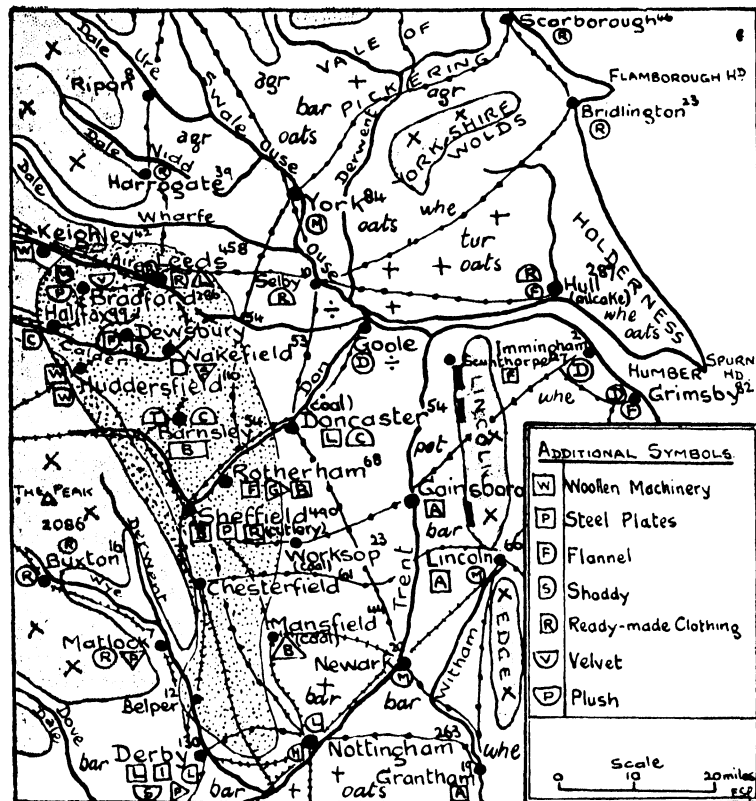


FIG. 107.

Spurn Head is a low spit formed of some of the rock waste transported southwards by the tidal currents (Fig. 107).

Draw a sketch map of east Yorkshire. Mark upon it Flamborough Head and the names included in the above passage.

5. Use pale layer tints on Fig. 108 to show the general character of the relief. Draw a section from x to y.

*6. Account for the fact that the Vale of Pickering is not drained directly to the North Sea (see Figs. 14 and 17).

7. **Lincolnshire and the Wash Basin.** In

upon it the names contained in the passage and the chief railway routes (Fig. 109).

8. The Fen district of Lincoln is called Holland. Why is this name given to it?

9. Describe the importance of the positions of Lincoln, Bedford, Peterborough, and Cambridge respectively.

10. **East Anglia.** East Anglia lies to the east of the Wash and East Anglian Heights, and includes the greater part of the counties of Norfolk, Suffolk, and Essex. The region forms the northern part of the London Clay Basin and is, on the whole, a level plain covered

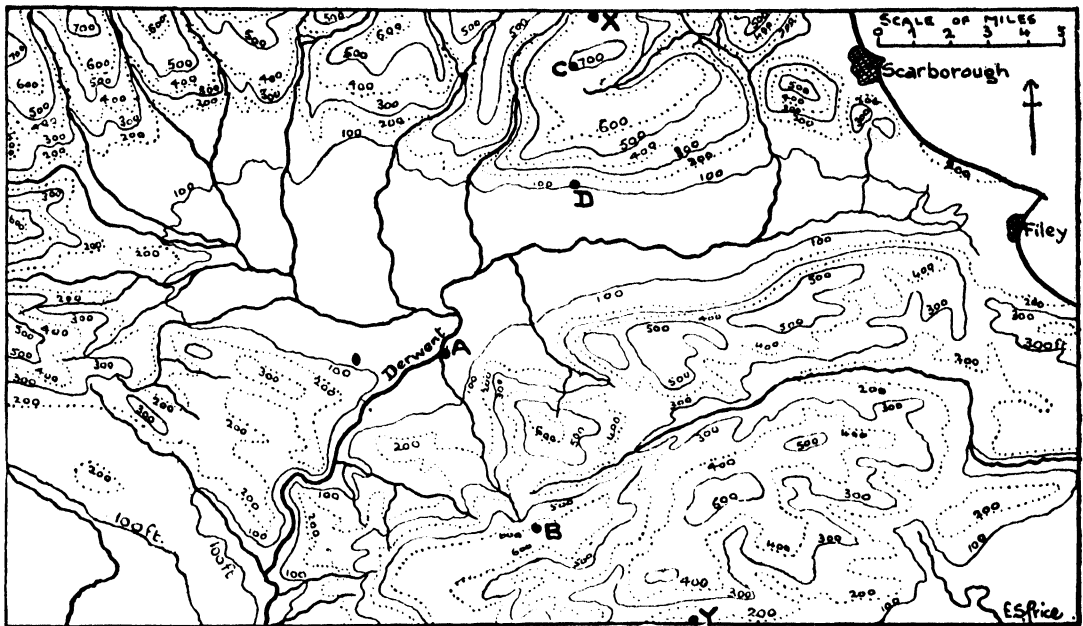


FIG. 108.

with thick deposits of boulder clay. The chalk ridge, which reaches 900 feet in the Chiltern Hills, sinks to below 300 feet in Norfolk, and rarely does the chalk appear at the surface. Along the north coast of Norfolk the clay forms low cliffs, the erosion of which produces the debris which tidal currents deposit along the coast farther south. The drowned lower valleys of the Orwell, Stour, Colne, and Chelmer form estuaries, but farther north tidal deposits have straightened the coast and converted estuaries into lakes. Some of these lakes have been filled up by silt; others are only partly filled up, and appear as irregular sheets of water connected by winding channels. The Norfolk Broads, a remnant of the former estuary of the river Yare, is a typical example of the latter.

Enter the names contained in the above passage

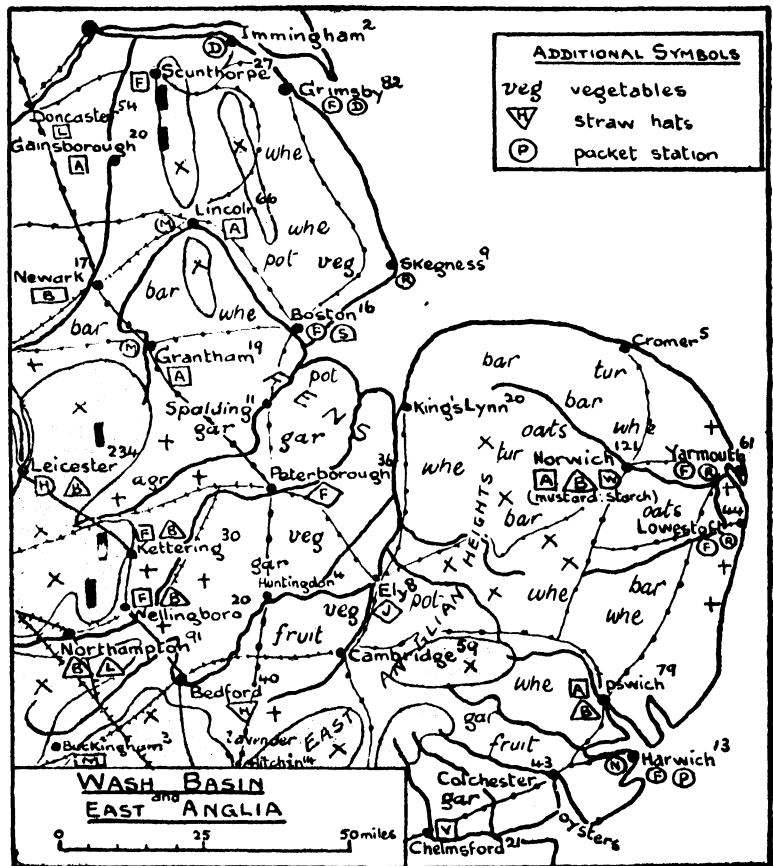


FIG. 109

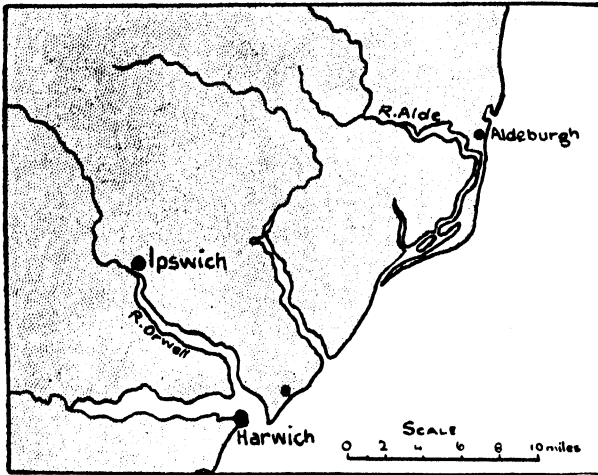


FIG. 110.

upon a sketch map of the region. Mark also the railway routes (Fig. 109).

11. Fig. 110 shows the lower course of the river Alde in Suffolk. Account for (a) the lake-like expansion of the river, and (b) the direction of the lower course of the river from (a) to the sea.

12. Describe the position of Norwich and of Ipswich.

13. **Thames Basin.** This region, which extends from the Cotswold Hills to the North Sea, may be divided into four parts :

(a) The broad limestone uplands of the Cotswold Hills and Edge Hill sloping gently towards the south-east and steeply towards the north-west.

(b) A belt of lowlands formed chiefly of sands and clay and drained by the Upper Thames.

(c) The chalk uplands of the Marlborough Downs and the Chiltern Hills, which, like the Cotswolds, slope steeply to the north-west and gently to the south-east.

(d) A lowland region of clay and sand lying between the Chiltern Hills and the North Downs and drained by the Lower Thames.

The Upper Thames is formed by the union of a number of streams which drain the dip slopes of the Cotswold Hills.

At first it flows in an easterly direction along the clay lowlands and receives the waters of the Windrush, which rises in the Cotswolds. Near Oxford the Thames turns southwards and is joined by the Cherwell, which rises in the Northampton Heights. After receiving the waters of the Thame on the left bank, the Thames flows through the gap which it has cut through the chalk uplands. This gap is called the Goring Gap. The Kennet, which rises in the Marlborough Downs, empties its waters into the Thames at Reading. Between Reading and the sea the Thames winds

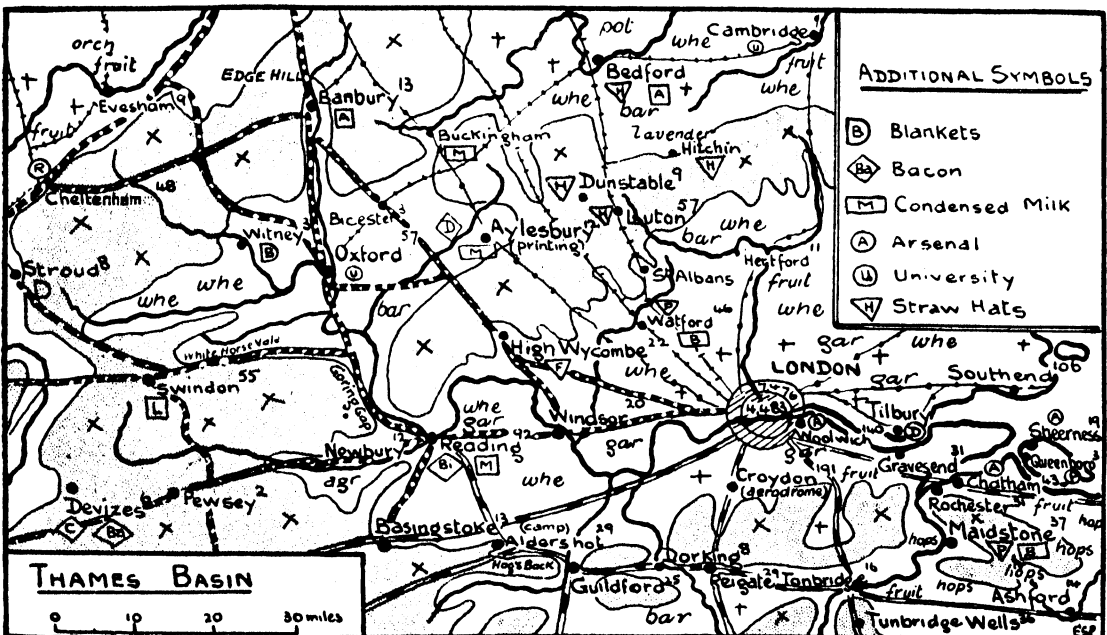


FIG. 111.

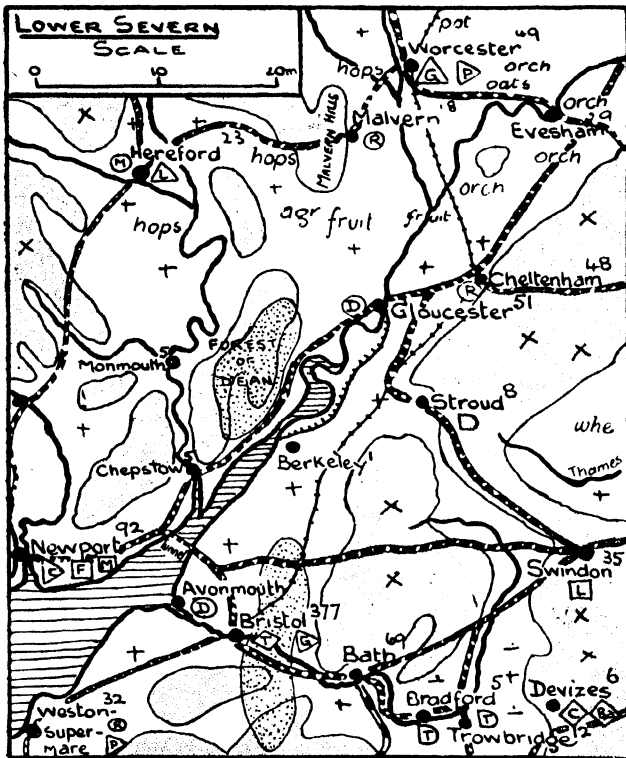


FIG. 112.

considerably, but maintains a general easterly course, receiving on the left bank the Colne and the Lea, and on the right bank the Mole, Wey, and Medway. Below London, much of the land is very low, and embankments have been built to confine the river to its channel.

Draw a map of the Thames Basin. Mark upon it (a) the names contained in the above summary, (b) the gaps in the Chiltern Hills followed by railways, (c) the chief railway routes from London (Fig. 111).

14. Describe carefully the position of Reading and of Oxford.

15. Refer to Chap. III, question 25 and explain how the Goring Gap was formed. Draw a contour map to show a transverse valley.

16. **Bristol Avon Region.** A low watershed, running across the Oxford Clay Vale, separates the Bristol Avon from the upper Thames. The Avon rises on the dip slope of the Cotswold Hills and flows in a south-easterly

direction until it reaches the clay vale in which the Upper Thames lies. It then turns to the south-west and follows the foot of the Cotswolds until it reaches Bradford-on-Avon, where it bends at right angles and flows through a narrow gorge which it has cut across the oolitic escarpment. Below Bristol it enters a still narrower gorge cut in the carboniferous rim of the Bristol coal-field, and after emerging, flows over alluvial flats into the Severn Estuary. Draw a map of the Bristol Avon Basin. Mark upon it (a) the names contained in the above passage; (b) the Mendip Hills, Salisbury Plain, Vale of Pewsey; (c) the chief railway routes (Fig. 112).

17. Draw a section across Fig. 113 from A to B.

18. State briefly how the relief features have affected the direction of the railway routes.

19. Describe the position of Bristol and of Bath.

20. **The Weald Region.** This region lies to the south of the Thames and east of the Hampshire Downs. The centre of the Weald is occupied by the Forest Ridges, a hilly piece of country still covered with much woodland. To the north of the Forest Ridges lies the Vale of Kent, a low plain overlooked by the steep scarp of the North Downs.

South of the Forest Ridges is a similar plain called the Vale of Sussex, overlooked by the scarp of the South Downs. The North and South Downs, which are from 400 to 600 ft. high, form bold cliffs where they reach the

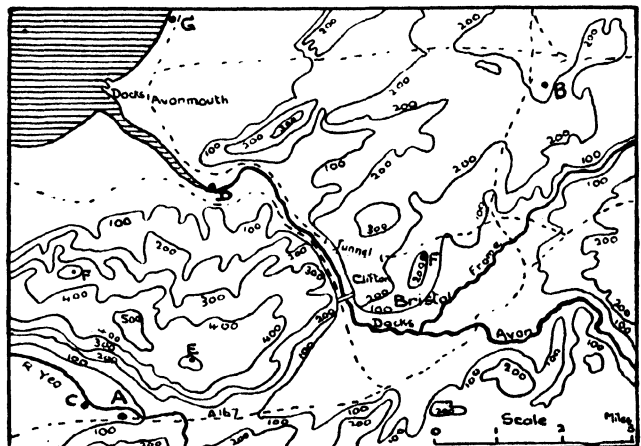


FIG. 113

coast, the former at South Foreland and Dover, and the latter at Beachy Head. Dungeness is a low cape formed of shingle deposited by tidal currents. The chief rivers of the region are the Wey, Mole, Medway, Stour, Ouse, and Arun, all of which have cut gaps in the Downs. The channel of the Wantsum, which at one time separated the Isle of Thanet from the mainland, is now silted up.

Draw a map of the Weald Region. Mark upon it (a) the names contained in the above summary; (b) North Foreland, Goodwin Sands, Romney Marsh; Isle of Sheppey, Guildford Gap, Dorking Gap; (c) the railway routes from London (Fig. 114)

21. Describe how Romney Marsh was formed.

at one point to over 1,000 ft. This plateau contains many valleys, but only the large valleys have rivers in them. Portland Island is joined to the mainland by a long shingle beach built up by tidal currents.

Draw a map of the region described above. Mark upon the map (a) the names contained in the passage; (b) the Needles, Solent, Spithead; (c) the railway routes (Fig. 115).

24. Draw a map to show the course of the Frome before the sea invaded its valley.

25. Describe the position of Southampton and of Winchester.

26. **Northern Ireland.** The Donegal Highlands in the north-west of Ireland are a continuation of the Highlands of Scotland. Although

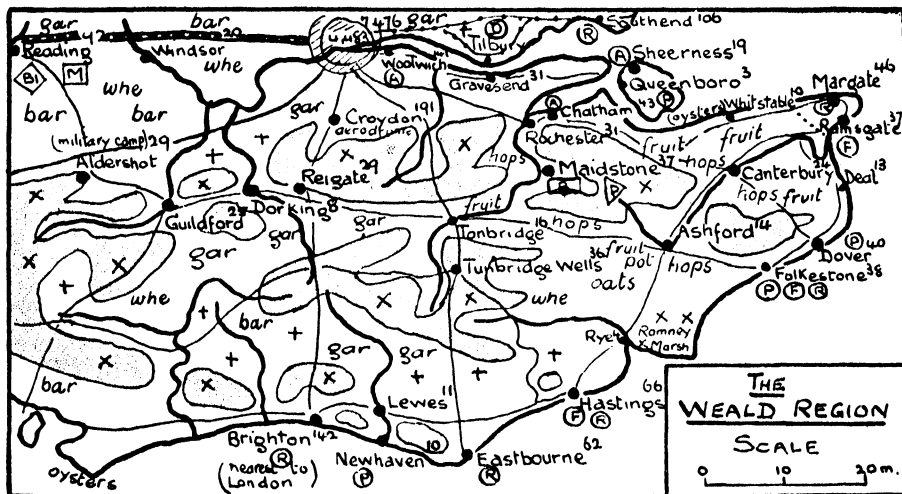


FIG. 114.

22. Describe the positions of London, Rochester, Maidstone, Brighton, Dover

23. **Hampshire Basin and Salisbury Plain.** The Hampshire Basin is a lowland region which lies to the south of Salisbury Plain and the Hampshire Downs and extends from the Dorset Downs on the west to the South Downs on the east. The chalk which underlies the clays and sands of the basin reappears in the Isle of Wight and in the so-called Isle of Purbeck. Formerly the chalk of these two districts formed part of a continuous ridge. At that time the Isle of Wight was part of the mainland and the river Frome, which now enters the sea at Poole Bay, entered the English Channel somewhere between the Isle of Wight and Selsey Bill. The Stour, Avon, Test, and Itchen, which drain the Hampshire basin, were formerly tributaries of the Frome. Salisbury Plain and Hampshire Downs form a plateau, rising

not so high, the mountains of this region are similar in character to the mountains of Scotland. They are separated from the infertile moorlands of the Sperrin Mountains by the river Foyle and from the Sligo Mountains by the river Erne. The river Erne rises in the Central Plain and flows through a number of lakes, the largest of which are called the Upper and Lower Loughs Erne. These lakes are called **solution lakes**, and are due to the solution of the limestone over which the river flows. The north-west coast is a fiord coast, and is for the most part high and rocky. Lough Swilly and Donegal Bay are the chief inlets. Lough Foyle is the drowned lower end of the Foyle valley. The plateau of Antrim, in the north-east of Ulster, is built up of successive sheets of lava. A subsidence formed by the faulting of the lava is occupied by Lough Neagh, the largest lake in the British Isles. The basaltic pillars of Giant's

Causeway are like those of the Island of Staffa. Lough Neagh is surrounded by fertile lowlands, branches of which extend to Coleraine, Belfast, and Newry and to Upper Lough Erne. These lowlands are drained by the Bann, Lagan, and Blackwater rivers. The Bann and the Lagan rise in the Mourne Mountains, a mass of granite which forms dome-shaped hills rising to 2,800 ft.

Draw a map of Northern Ireland. Mark on the map (a) the names given in the above passage; (b) Fair Head, Belfast Lough, Strangford Lough, Carlingford Lough; (c) Ulster and Newry canals and the chief railways (Fig. 116).

27. Examine the geological map and find in what way the Lagan Valley resembles the valleys of the Eden and the Clwyd.

28. Describe carefully the geographical position of Belfast and of Londonderry.

29. Central Plain of Ireland.

The Central Plain rarely rises to 500 ft. It is formed, for the most part, of almost horizontal layers of carboniferous limestone, and glacial deposits cover most of the area. Bogs, which are common in the highland regions, also cover a large part of the Central Plain. The largest of these bogs is the Bog of Allen, which lies to the north-west of Kildare. Between Loughs Conn, Mask, and Corrib and the West Coast the isolated mountains of Connemara and Mayo County rise above the plain to a height of 2,700 ft. These mountains are similar in character to the Donegal Mountains. The greater part of the plain is drained by the river Shannon, which, after rising in the hills to the east of Lough Allen, flows southwards and passes through Loughs Allen, Ree, and Derg. Near Killaloe it forms a series of rapids in the gorge which it has cut in the slaty rocks of Slieve Bernagh. Below Limerick the Shannon enters its long, narrow estuary. On the right bank it receives the Suck, and on the left the Brosna. Both these tributaries enter the main stream between Loughs Ree and Derg. The chief rivers draining the eastern part of the plain are the Boyne and the Liffey.

Draw a map of the Central Plain. Mark upon it (a) the names contained in the above

passage; (b) Sligo, Killala, Clew, Galway, Dundalk, and Dublin Bays; (c) the chief railways and the Royal and Grand Canals (Fig. 116).

*30. Explain the origin of the bogs which cover so large a part of the Central Plain.

31. **Southern Ireland.** The Slieve Bloom, Silvermine, and Wicklow Mountains, which lie to the south of the Central Plain, are formed of the same rocks as the Southern Uplands of Scotland and North Wales. A large part of the Wicklow Mountains, however, is formed of granite, which, as in other granite regions, weathers into dome-shaped summits. Although

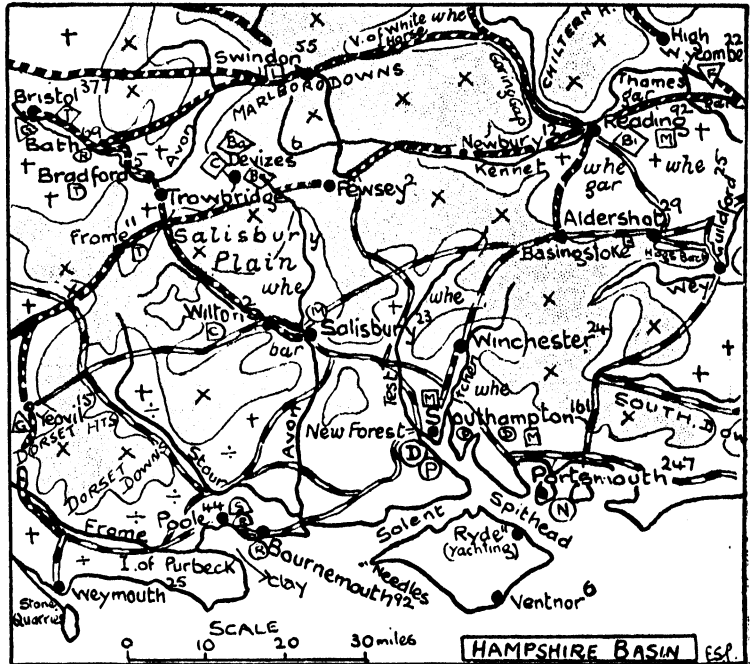


FIG. 115.

the feature lines of this part of Ireland run from S.W. to N.E., the chief rivers, the Upper Suir, Nore, Barrow, and Slaney, flow towards the south, which is another point of resemblance to the Southern Uplands. The rivers in the extreme south of Ireland flow in east to west valleys and are flanked by ridges running in the same direction. The nature of the rocks and the trend of the features suggest a former connection with South Wales and the Cornwall and Devon Peninsula, where the same rocks and the same trend of the relief features may be seen in the Gower Peninsula, Brecon Beacons, Mendip Hills, and Exmoor Forest. In the south of Ireland the earth's crust was bent into

between Dingle Bay and Kenmare River, rise to over 3,400 ft. in the ridge called Macgillicuddy's Reeks. Near the south coast the rivers Suir, Blackwater, Lee, and Bandon turn at right angles and cut through the mountain ridges in gorges, which subsidence has converted into estuaries bearing the names of Waterford, Youghal, Cork, and Kinsale Harbours.

Draw a map of the above region. Mark upon it (a) the names included in the above passage; (b) Valentia Island, Berehaven, Cape Clear Island, Carnsore Point, Wexford Harbour; (c) the railway, (i) from Cork to Dublin, (ii)

from Rosslare to Limerick, Cork and Dublin, respectively (Fig. 116).

32. Distinguish between a fiord coast and a ria coast.

33. Examine the relief map in your atlas and suggest reasons for the shallowness of Wexford Harbour.

34. Describe the positions of Limerick, Cork, Waterford, and Dublin respectively.

H. 35. Construct models in clay (or in any other medium) of the block model diagrams contained in this and in the preceding chapter. Colour the cross-section of each model to show the structure.

CHAPTER XIII

MAP MAKING AND MAP READING

G. 1. **A**LTHOUGH map reading concerns us far more than map making, the principles which underlie the construction of maps should be understood. It was stated in Book I that most methods of making maps are based upon the construction of triangles, and exercises were introduced to illustrate this principle. Those exercises, however, required that all the sides of the triangles into which an area was divided should be

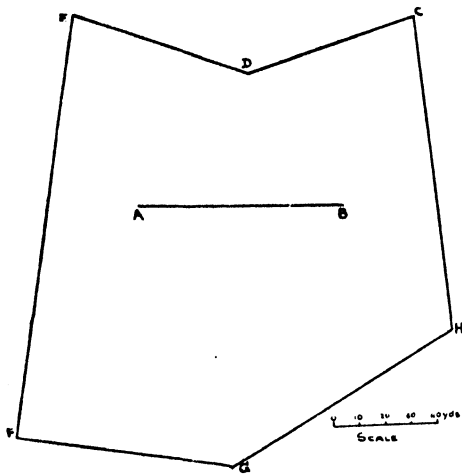


FIG. 117.

actually measured—a laborious and unnecessary procedure, as the following exercises will show.

Three trees, A, B, and C, are so situated that the distance between B and C is 150 yds. The angle CBA is 50° and the angle BCA is 70° . Draw a plan to scale to show the relative position of the trees. How far is A from B?

G. 2. A, B, C, and D are the four corners of a field. The distance across the field from B to D is 250 yds. The angle DBA is 60° , BDA is 50° , DBC is 30° , and BDC is 80° . Draw a plan of the field to scale and find the length of each side.

G. 3. A, B, C, and D are the four corners of a field. The length of the hedge BC is 160 yds. The angle CBA is 85° , BCA is 50° , CBD is 45° , and BCD is 70° . Draw a plan of the field to scale and find the distance across the field from B to

D. A tree, X, is situated near the middle of the field. It was found by measurement that the angle CBX was 40° and the angle BCX was 45° . Mark the position of the tree on your plan and find its distance from B.

G. 4. Let Fig. 117 represent an irregular field near the centre of which a base line AB is marked and accurately measured. In the boundary of the field prominent objects C, D, E, etc., are found, some of which have been placed there temporarily for the purpose of the survey. Refer to the figure and to your answers to questions 2 and 3 and state what must be done in order to find the positions of C, D, E, etc.

G. 5. The best instrument for measuring angles is a theodolite (Fig. 118), but a suitable substitute may be made on the school premises with very little labour, provided that a plane table (Fig. 119) is available.

Procure a sheet of cardboard about 15 in. square, and draw upon it a circle at least 12 in. in diameter. Graduate the circle from 0° to 360° and draw a straight line from the centre X to the zero mark on the circumference. Fix the protractor which you have made to the plane table. A sight rule, a spirit-level, a chain, or tape, an ordinary pin and a magnetic compass are also required.

With the help of the directions given below use this instrument to survey your playground, or school field. The directions given refer to the area represented in Fig. 117.

(a) On a level part of the ground near the centre of the area measure a base line AB.

(b) Place a peg in the ground at A and a pole at B.

(c) Set up the instrument over A so that the centre X of the protractor lies exactly over the peg.

(d) Level the plane table with the spirit level.

(e) Push a pin into the centre X of the protractor.

(f) Place the sight rule against the pin with its edge lying along the zero line.

(g) Loosen the screw which fastens the table to the tripod.

(h) Turn the table slowly until the zero line

points directly to B, that is, until the pole at B is visible through the slit in the sight rule.

(i) Tighten the thumbscrew.

(j) Keeping the sight rule against the pin, sight in turns the objects C, D, E, etc., read off

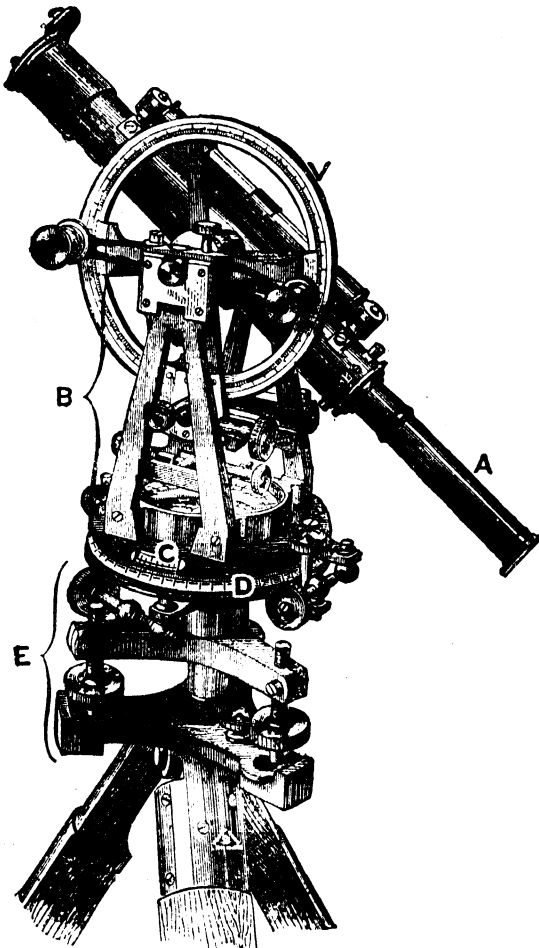


FIG. 118.

the angles, and enter the angular measurements in the field book as they are read off.

Note.—All angles must be measured clockwise from zero. See field book entries in question.

(k) Remove the plane table and the peg from A, and set up a pole in the hole previously occupied by the peg.

(l) Proceed to B. Remove the pole and repeat the operations, c to j, described above, substituting B for A.

G. 6. Draw a plan of the field represented in Fig. 117 from the field book entries given below

BASE LINE AB = 80 YARDS (Fig. 117)

From A to	From B to
B = 0°	A = 0°
H = 21°	E = 35°
G = 70°	D = 54°
F = 118°	C = 111°
E = 252°	H = 227°
D = 311°	G = 294°
C = 327°	F = 326°

From the latter part of your answer to question 3 you will have gathered that the position of any number of points, other than those in the boundary, may be fixed on the plan by the method described in question 5.

***7.** No plan is complete until a N.-S. line has been drawn upon it. The direction of the north line must be found in the field when the angular measurements are being made.

Explain how you would use your instrument and a box compass to find the **magnetic bearing** of B from A, and how you would proceed to draw a N.-S. line on your plan of the school field.

***8.** Learn how to use the plane table, then describe in your notebook how you would use the table to draw a plan of the area represented in Fig. 117.

G. 9. With the plane table draw a plan of the school field. Mark on the plan the position of the pavilion and any other prominent objects situated in the field.

10. At a later stage we shall discuss the methods used for drawing contour lines on maps. It may be stated here that they all depend upon finding the heights of a number of points whose positions are plotted on a map. Fig. 120 is a map of a small area. The dots represent the positions of points whose heights have been found. The contour line for 200 ft. has been drawn. Draw the contours for 300 ft., 400 ft., 500 ft.

11. The practice which you have already had in drawing sections and in reading contour maps will have helped you to construct mental pictures of the actual features of certain areas. Turn again to the 1-inch maps of the Ruabon district and of your home

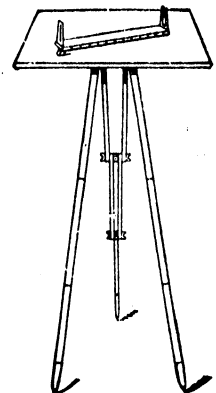


FIG. 119.

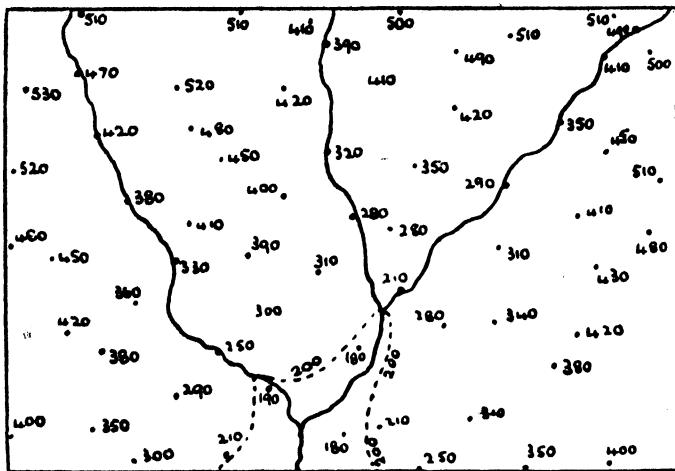


FIG. 120.

area. Notice particularly how the relief features are mapped—valleys, spurs, steep slopes, gentle slopes.

12. Fig. 121 shows three different kinds of slopes, viz.: (a) uniform slope; (b) concave

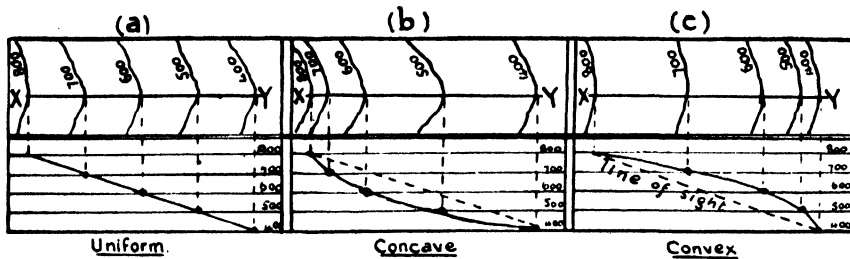


FIG. 121

slope; (c) convex slope. Examine the contour lines in each case. What differences do you notice in the arrangement of the contours?

13. Find examples of each kind of slope on the 1-inch map of your own district. Copy one example of each into your notebook and draw a section.

14. Examine the sections in Fig. 121. Notice that in (a) and (b) X and Y are intervisible. In (c) X and Y are not intervisible; why not?

A further study of the figure will enable you to discover that a point Y is not visible from a point X if any one contour line passing between them is nearer the lower point Y than on a uni-

form slope between similarly situated points.

15. Let us apply the last section of question 14 to the irregular slope shown in Fig. 122. Is Y visible from X? Since X is 600 ft. high and Y is 100 ft. high and the vertical intervals are 100 ft., a uniform slope between X and Y would be divided into five equal parts by the contour lines. Divide XY into five equal parts as shown. The points A, B, C, and D show where the 500 ft., 400 ft., 300 ft., and 200 ft. contours would be cut by XY if the slope between X and Y were uniform. The fact that Z on the 300-ft. contour line lies nearer Y than C proves that Y is not visible from X. Check the

above answer by drawing a section.

*16. Describe any other methods you may have learned for discovering whether two points on a map are intervisible.

17. In Fig. 123 are A visible from C, D from E,

F from G, K from J? State how you arrive at your answers.

Draw a section from G to H.

18. How high must an aeroplane rise above E in Fig. 123 to be just visible from D?

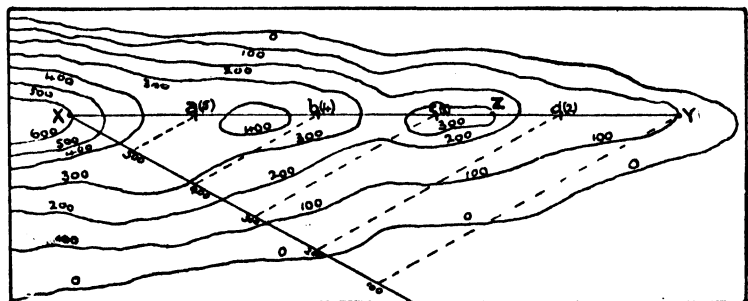


FIG. 122.

The top of the spire of a church at M is 100 ft. above the ground. Is it visible from C?

19. Find on Fig. 123 a flood plain, a spur, a divide, a knoll, a col, a pass. Describe the view from N towards the south-west.

20. A small port A is situated a mile from the sea on the right bank of a meandering river

surface rising gradually towards the north. The river has cut a narrow gap in the hills almost down to sea-level. At the northern end of the gap, on the west side, is a market town B. There are first-class highroads from east to west at both sides of the hills, and one connecting A and B, which is five miles long. There is also

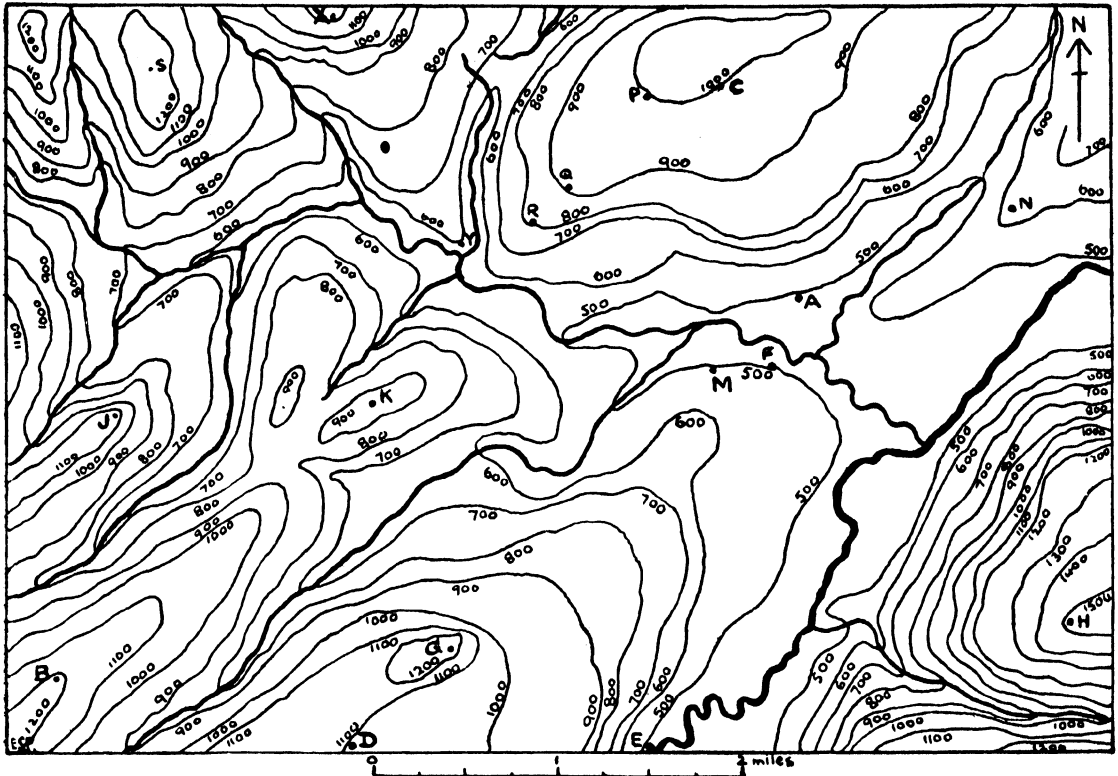


FIG. 123.

which flows from the north. The district about A consists of three distinct areas: (a) a low coastal plain, about a mile wide stretching E.-W.; (b) north of this a parallel range of scarped hills, sloping gently towards the coast and with flat-topped summits at from 300 to 500 ft. above the sea; (c) north of the hills, at the foot of the scarp slope, a lowland of irregular

a railway along the coastal plain and another branching from it at A and stretching northward through B.

Draw a map of the district showing all the facts here mentioned. Give the scale and a key to all the symbols you use.

21. Work any further exercises which may be set you on Figs. 88, 108, and 113.

CHAPTER XIV

CLIMATE, OCEAN CURRENTS

PRESSURE AND WINDS

1. **E**NTER into your notebook the following summary of some of the main facts which you have learned, relating to pressure and winds, adding explanatory notes where you think necessary

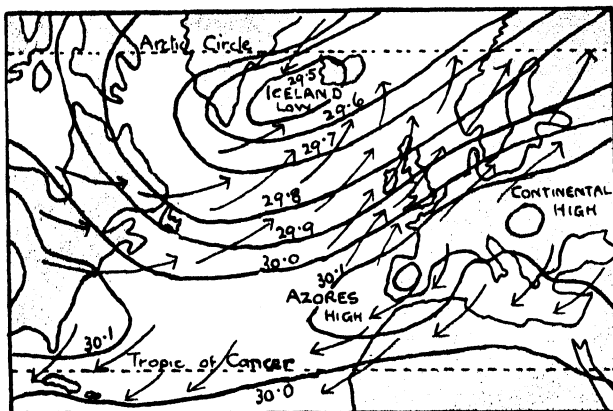


FIG. 124.

- (a) Winds are due to differences in atmospheric pressure.
- (b) Winds blow from regions of higher pressure towards regions of lower pressure.
- (c) Heat tends to produce a low-pressure area.
- (d) Cold tends to produce a high-pressure area.
- (e) In summer continental interiors are hot and become low-pressure areas, towards which air moves from regions of higher pressure.
- (f) In winter continental interiors are cold and become high-pressure areas from which air moves towards regions of lower pressure.
- (g) Winds do not blow directly outwards from a high-pressure area nor directly inwards towards a low-pressure area, but, in both cases, are deflected to the right in the northern hemisphere and to the left in the southern hemisphere.

2. Examine the maps which show the

distribution of pressure over North America (Figs. 35 and 36). Describe and account for the position of the high-pressure areas in summer and in winter respectively.

3. It was stated in Book I that permanent low-pressure areas exist over the oceans in the neighbourhood of the Arctic Circle. These areas are shown on the pressure maps of North America. Describe the exact position of each area.

State and give reasons for the direction of the winds in summer and winter at Vancouver and New Orleans.

4. Figs. 124 and 125 show the distribution of pressure over the North Atlantic in January and July. Notice that the British Isles lie on the margins of three pressure areas. Name and locate these pressure areas and suggest reasons why the prevailing winds over the British Isles tend to be south-westerly in winter and westerly or north-westerly in summer.

TEMPERATURE

5. One of the outstanding features of the climate of the British Isles is the exceptional mildness of the winters. Examine Fig. 126 and describe the course of isotherm 40°F . What is the difference between the January temperature of Great

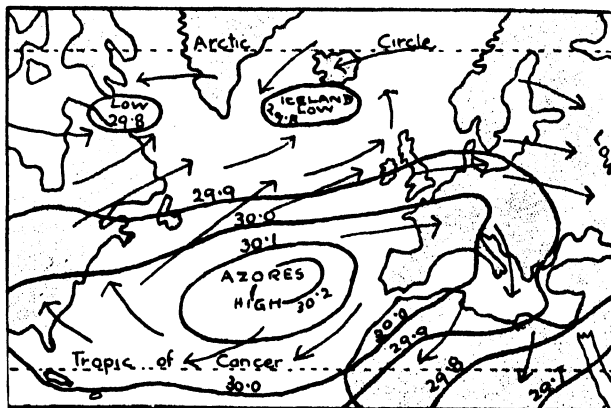


FIG. 125

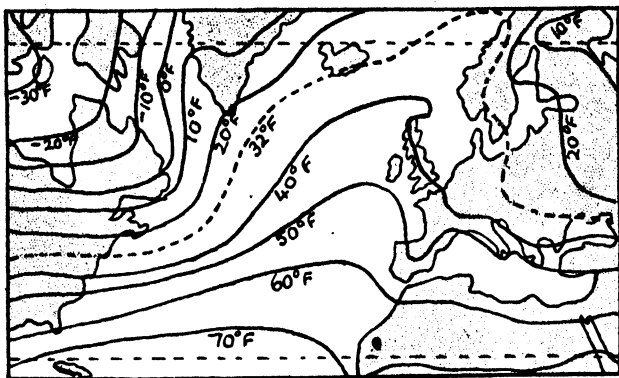


FIG. 126.

Britain and Labrador? Suggest reasons for the difference.

6. The relatively high temperature of the south-westerly winds is not due solely to the fact that they come from warmer latitudes. You will learn at the close of the present chapter that, under the influence of the south-westerly winds, a great volume of warm water is drifted towards north-west Europe from lower latitudes. This moving body of warm water,

called the North Atlantic Drift, helps the south-westerly winds to retain a large proportion of their original warmth.

Turn to the January Isotherm Map for the British Isles (Fig. 127). Draw graphs to show the rise and fall of temperature along the lines AB, CD, and EF. State what the graphs show.

7. Study Fig. 127 carefully and explain as fully as you can why in winter (a) the west of Britain is warmer than the east; (b) there is a minor "gulf of warmth" between Ireland and Great Britain; (c) S.W. Ireland, Pembrokeshire, Cornwall, and Devon are the warmest parts of the British Isles;

(d) Scotland, east of the Grampians, the Humber and Wash Basins, and East Anglia are the coldest parts; (e) the north-west corner of Scotland is as warm as the Isle of Wight, and is warmer than all parts of Britain which lie to the east of the Isle of Wight.

8. Use the facts enumerated above to describe the distribution of temperature over the British Isles in winter.

9. Study the July Isotherm Map (Fig. 128).

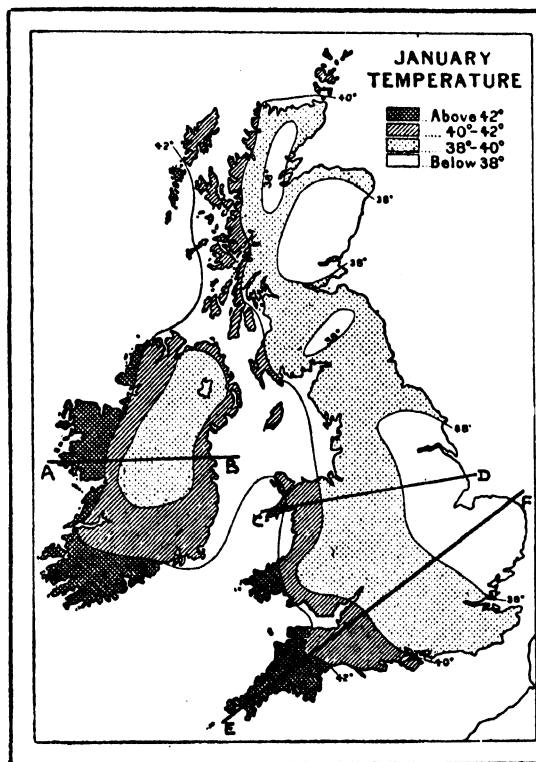


FIG. 127

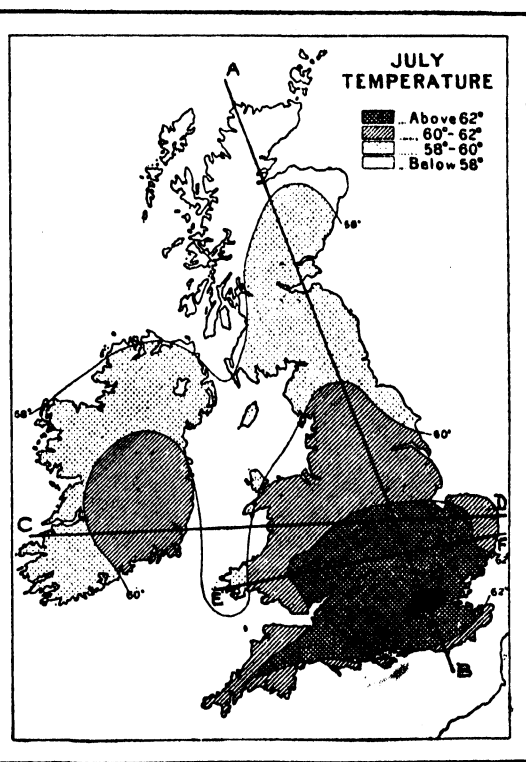


FIG. 128.

Draw graphs to show the rise and fall in temperature along the lines AB, CD, and EF. State what the graphs show.

10. Explain as fully as you can why, in

the 60° F. July isotherm. Draw (a) oblique lines (from N.W. to S.E.) over those parts of Great Britain and Ireland where the average mean temperature for July is below 60° F., and (b) oblique lines in a N.E.-S.W. direction where it is above 60° F.

Your map is now divided into the following temperature regions: (i) regions with very warm summers and rather cold winters; (ii) regions with very warm summers and mild winters; (iii) regions with cool summers and rather cold winters; (iv) regions with cool summers and mild winters.

Draw up a table to show the parts of the British Isles included in each region.

13. Temperature maps, such as Figs. 127 and 128, are only sufficient for general comparisons. The actual temperature of several parts of the British Isles is lower than would appear from the isotherm maps.

What is an isotherm? State clearly how an isotherm map is produced.

14. Study carefully the statistics given in the following table, after locating the places on your maps. Find the annual range of temperature at each place, and explain why the range is greater in the "London Basin" than in any other part of

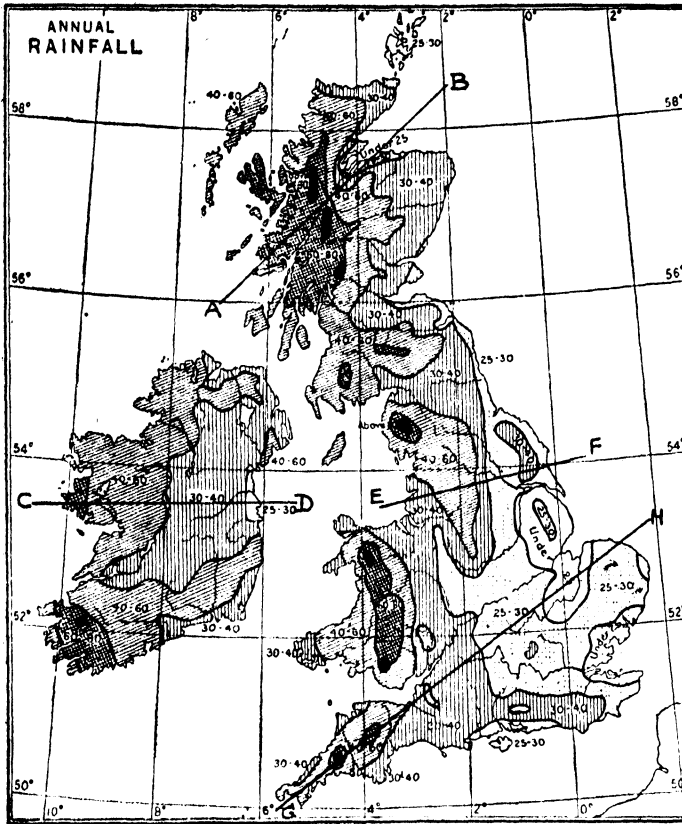


FIG. 129.

summer, (a) generally speaking, temperature decreases as latitude increases; (b) the highest temperature is not along the south coast but around London; (c) the coastal regions are everywhere cooler than the interior in the same latitudes; (d) the west coast is cooler than the east coast in the same latitudes; (e) there is a minor gulf of cool air between Ireland and Great Britain.

11. Use the facts enumerated above to describe the distribution of temperature over the British Isles in summer.

12. On a sheet of transparent paper trace the outline of Fig. 127. Draw also the 40° F. January isotherms. Shade your map by drawing (a) horizontal lines over those parts of Great Britain and Ireland where the average mean temperature for January is below 40° F., and (b) vertical lines where it is above 40° F.

Place your tracing over Fig. 128 and insert

the British Isles:

Place.	Jan.	Mar.	May.	July.	Sept.	Nov.
Aberdeen .	38	40	48	57	53	42
North Shields .	39	40	48	58	54	43
Yarmouth .	37	40	50	60	57	44
Londonderry .	40	42	51	58	55	44
Dublin .	42	43	52	60	56	45
Valentia Islands	45	45	52	59	56	48
Pembroke .	43	43	51	59	57	47
London .	38	43	55	64	58	44
Plymouth .	44	45	53	61	58	47

RAINFALL

15. State carefully how rainfall is measured, and explain the meaning of "mean annual rainfall."

16. Examine the rainfall map (Fig. 129), and draw a graph to show the rise and fall of the mean annual rainfall along the lines AB, CD, EF, and GH. State what your graphs show.

17. Verify the following facts from a study of the rainfall map :

(a) The western sides of Great Britain and Ireland are much wetter than the eastern sides.

(b) The regions of heavy rainfall are the regions of greatest altitude.

(c) The wettest regions are (i) the Western Highlands of Scotland, (ii) the Lake District, (iii) Wales, (iv) S.W. Ireland.

(d) The driest regions are (i) Holderness, (ii) the Wash and Lower Trent Basins, (iii) the London Clay Basin, (iv) around Moray Firth.

18. You have learned that the distribution of rainfall depends chiefly upon (i) direction of winds, (ii) height of the land, (iii) nearness to the sea from which the rain-bearing winds blow. Discuss the influence of the above factors upon the distribution of rainfall over the British Isles.

19. Study the statistics contained in the following table. What conclusions do you draw from the table as to the seasonal distribution of rainfall over the different parts of the British Isles ?

20. Reference was made in question 6 to the influence of the North Atlantic Drift upon the climate of N.W. Europe. Name currents which indirectly influence the climate of continental margins and state the countries affected by each of the currents named.

*21. Refer to a text-book on physical geography or to any other available source and answer the following questions in your note-book.

Explain how ocean currents are caused (see Fig. 130). Account for the "clockwise" direction of the currents in the northern hemisphere and the "anti-clockwise" direction in the southern hemisphere.

*22. What is the difference between (a) tidal currents and ocean currents, (b) drifts and currents ?

*23. Describe with sketch maps, the general direction of the principal ocean currents of (a) the North Atlantic, (b) the South Atlantic, (c)

RAINFALL IN INCHES

	Dec., Jan. & Feb.	Mar., Apr. & May.	June, July & Aug.	Sept., Oct. & Nov.	Mean Annual.
Wick	7	6	7	8	28
Edinburgh Fort	5	5	7	7	24
William Glasgow	27	14	15	24	80
	9	7	9	10	35
Belfast	8	7	8	10	33
Dublin	6	6	7	8	27
Cork	8	8	11	13	40
Valentia Is.	17	12	12	15	56
York	6	6	7	6	25
Yarmouth	5	5	7	8	25
Liverpool	6	6	8	10	30
Penzance	15	8	8	14	45
Birmingham	6	6	7	7	26

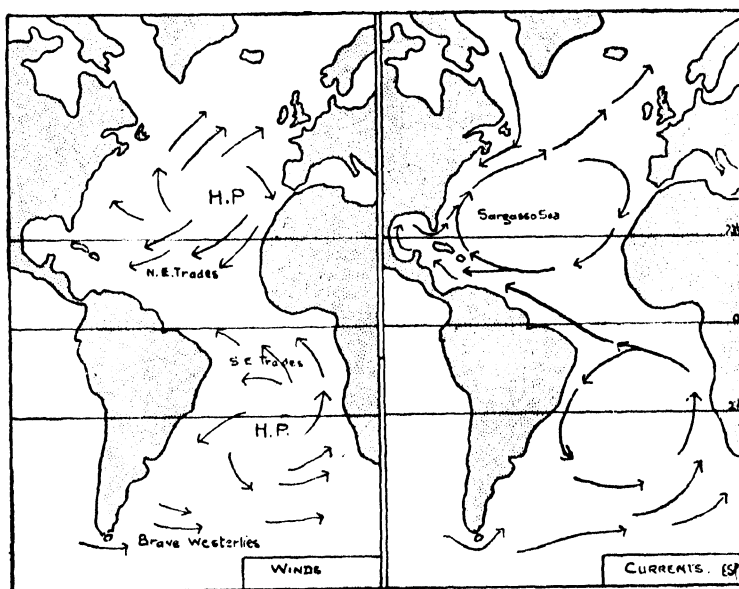


FIG. 130.

the North Pacific, (d) the South Pacific (Fig. 1). What is the Sargasso Sea ?

*24. State and account for the direction followed by sailing ships between England and New Zealand on the outward and homeward journey respectively.

CHAPTER XV

VEGETATION, CROPS, ANIMALS

1. **Y**OU have learned in the course of your history lessons that the lowlands of Britain were once largely covered with forests and marshes. To-day most of the lowlands are either cultivated or form rich pasture lands. The highlands remain much as they were in the days of the Romans.

A large scale map would be necessary to show the distribution of vegetation in the British Isles at the present time. Such a map would show (a) most of the highlands covered with heather, peat, bracken, and small berry-bearing bushes; (b) the uplands covered with grass, patches of woodland, and, in the southern part of the country, occasional fields of oats and root crops; (c) the lowlands covered with fields of grass, hay, grain and rootcrops, numerous scattered coppices and a few forests.

Details of the vegetation, crops, and other items are given in the tables in Appendix I. These tables should be carefully studied in conjunction with an atlas, and the exercises based upon them should be worked out. It will be much easier to work the exercises if maps are constructed to show the distribution of the various items given in the tables. The directions given below show how Fig. 131 was drawn from the statistics relating to mountain and heath pastures. Other distribution maps should be constructed in the same way:

(a) Place a sheet of tracing paper over a map showing county boundaries (Fig. 132). (Use paper clips to prevent the paper from slipping.)

(b) Trace the coast-line in ink.

(c) Place a light cross in pencil on the tracing paper over each county where 25 per cent. or more of the area is rough pasture.

(d) Draw continuous lines to enclose all the counties over which crosses are marked. It is only necessary to draw those parts of county boundaries which form part of the enclosing lines.

(e) Shade in solid black the area marked by crosses.

(f) Place a dot over each county where from 10 to 25 per cent. of the area is rough pasture.

(g) Draw continuous lines to enclose all the counties over which dots are found.

(h) Remove your map and shade the area or areas containing dots, as shown in Fig. 131.

(i) Complete the map by adding (i) the title and (ii) the key to the shading.

Construct distribution maps for the other items contained in the tables according to the following scale:

	Per 100 acres.		
	Unshaded.	Dots.	Solid Black.
	Acres.	Acres.	Acres.
Woods .	0- 6	6-10	over 10
Permanent pasture	0-35	35-50	over 50
Arable land	0-25	25-50	over 50
Wheat .	0- 4	4- 9	over 9
Barley .	0- 4	4- 9	over 9
Oats .	0- 4	4- 9	over 9
	Animals.	Animals.	Animals.
Cattle .	0-10	10-20	over 20
Sheep .	0-50	50-75	over 75

2. Describe the situation of the mountain and heath pasture. Compare Fig. 131 with the rainfall and relief maps and state the physical conditions of the regions occupied by rough pastures.

3. Study your woodland map and describe the situation of the best wooded regions in Britain.

4. Name some occupations carried on in this country which consume large quantities of timber.

*5. Britain does not produce nearly sufficient timber to meet her own requirements. Consult the tables of imports in *Whitaker's Almanack*, and enter into your notebook the names of the chief countries from which timber is obtained.

6. Compare your permanent pasture map with the relief map. Note the relief of the counties having more than half their area in permanent

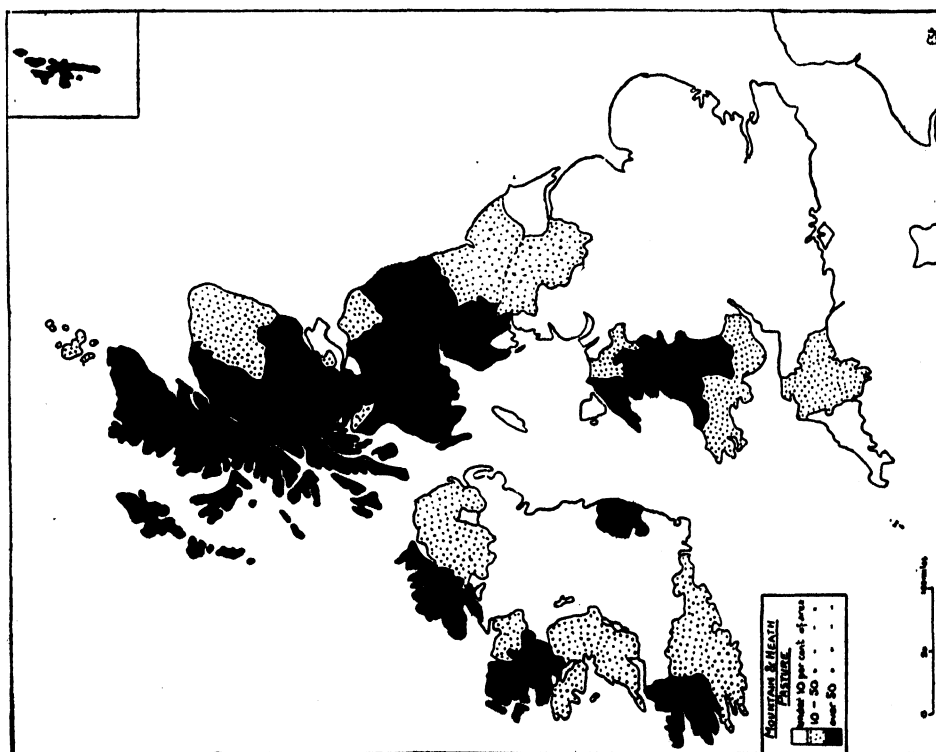


FIG. 131.

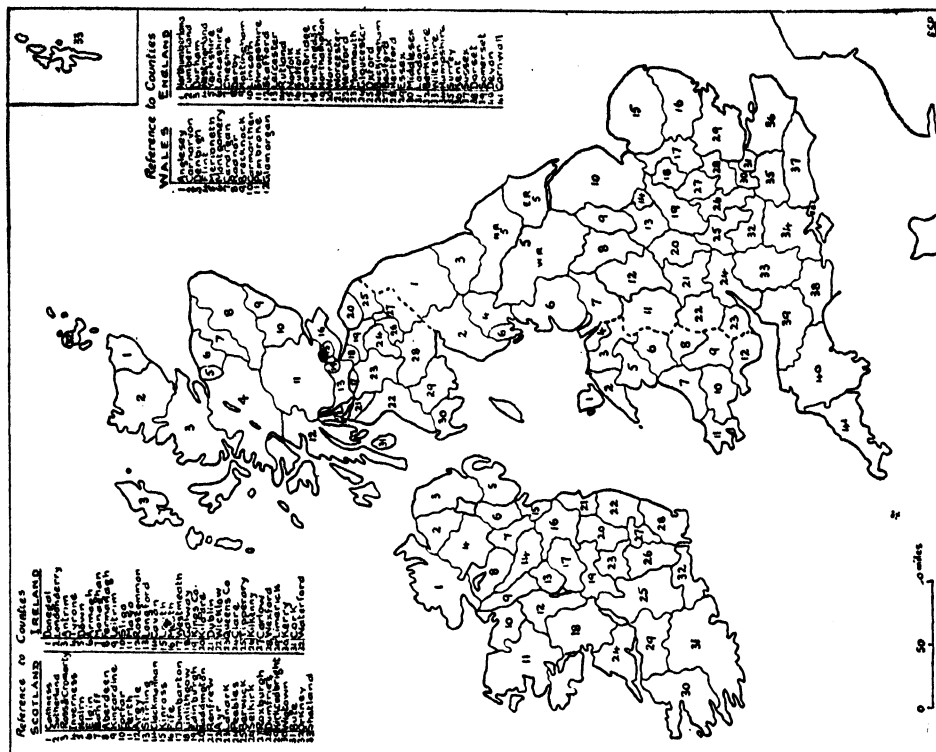


FIG. 132.

pasture. Show, in tabular form the counties where most of the rich pasture is (a) lowland, (b) upland.

7. Describe the character of the pastures, (a) on the oolitic and chalk uplands, (b) on the lowlands. Which kind of pasture is best for cattle?

8. Examine your permanent pasture map and explain why the percentage of good grazing land is so large in Ireland and so small in Scotland.

9. Study your arable land map. Describe the situation of the regions where more than half the area is under the plough. State the physical conditions which favour agriculture in those regions.

10. Cornwall, Anglesey, and Cheshire have a large percentage of their areas classified as arable land. Examine the various items in the tables and suggest reasons for the importance of agriculture in each of these counties.

11. Describe the physical conditions of the best cultivated parts of Scotland.

12. Explain why the percentage of arable land is greatest in England.

13. Explain why there is so little cultivation in those parts of England where the percentage of arable land is below 20 per cent. Is the low percentage due to the same reasons everywhere?

14. Examine your "sheep" map. Describe the situation of the regions which have most sheep per 100 acres. Describe the conditions which make these regions favourable to sheep rearing. Why are sheep better fitted for upland pastures than any other of our domestic animals?

Hy. 15. What was the "Black Death"? How did it lead to a great increase in the number of sheep reared in England? To what countries was wool exported from England at that time?

*16. To-day Britain is a great importer of wool and mutton. Consult *Whitaker's Almanack* and enter into your notebook the names of the chief countries from which wool and mutton are obtained.

17. Examine your "cattle" map. Describe the situation of the regions which have most cattle per 100 acres. Describe the conditions which encourage farmers to rear cattle in those areas.

18. In Scotland sheep are more important than cattle; in Ireland cattle are more important than sheep. Suggest reasons for this.

19. In 1923 we imported £44,000,000 worth of butter and over £15,000,000 worth of cheese. Name the chief countries from which they were obtained.

20. The table shows that pig rearing is

important where cattle are numerous. Can you suggest reasons for this?

*21. Consult *Whitaker's Almanack* for the meat imports of Britain, and name the chief countries from which bacon, eggs, and beef are obtained.

22. Describe the situation of the chief wheat-growing regions. Explain the conditions which favour the growing of wheat in the regions you name.

23. Less than 1 per cent. of the total area of (a) Ireland and of (b) Scotland, north of Fife, is devoted to wheat growing. Is the relative absence of wheat growing in these regions due to the same causes? Explain your answer.

24. Britain produces only one-fifth of the wheat consumed in the country. Prepare a list of the chief countries from which wheat is obtained.

25. The amount of oats grown in Britain is more than the amount of wheat and barley combined. Suggest reasons for this.

Britain produces more than 75 per cent. of the oats consumed in the country.

26. Examine the statistics in Appendix I. Compare the amount of land under oats with the amount of land devoted to other crops in each of the counties of Wales and Scotland. State what you notice and give reasons.

27. Compare your "barley" map with your "wheat" map. Is climate the most important factor in determining the distribution of barley?

28. Which counties of England grow large quantities of turnips? Suggest reasons for this, and explain why turnips are widely grown in Scotland.

29. Maize is an important animal food which does not ripen in Britain. Name the countries from which maize is obtained, and describe the climate of the regions in which maize is grown for export.

30. Particulars of crops other than those named in the Appendix may be found in the Government's Annual Publication called *Agricultural Statistics*, Part I, which should be consulted. The counties which produce the largest quantities of certain of those crops are named below.

Mark the particulars contained in the table on a county map of the British Isles.

31. Explain (a) why Kent is well suited for fruit growing, (b) why the Severn counties make cider but Kent does not.

*32. Name some fruits which are sold in Britain but are not grown here, and draw up a table to show the chief countries from which each kind is imported.

Apples.	Small Fruit.	Hops.	Flax.
Kent Devon Hereford Somerset Worcester	Kent Norfolk Hampshire Cambridge Lincoln Worcester Perth Lanark	Kent Hereford Sussex Worcester	Down Antrim London- derry Tyrone Armagh Donegal Monaghan Yorkshire

***33.** In addition to the products mentioned, Britain imports rubber, cotton, jute, hemp, flax, rice, sugar, tea, coffee, cocoa, copra, palm-oil, tobacco. Consult *Whitaker's Almanack* and draw up a table to show the chief countries from which each of the above products is obtained.

34. In question 12, Chapter X, reference was made to the fishing industry. This industry, directly and indirectly, supports about one-twentieth of the population, besides providing the people of the country with a cheap and wholesome food. It is estimated that the yearly consumption of fish in this country amounts to over 7,000,000 tons, whereas that of meat amounts to 2,500,000 tons.

The table below shows the quantities of the chief kinds of fish caught in British Seas.

Draw diagrams to represent graphically (a) the relative quantities of the different kinds of fish caught, (b) the total quantities caught in each country. State clearly what your diagrams show.

FISHERIES, BRITISH TAKING, 1923

Kind.	England and Wales.	Scotland.	Ireland.	Total.
	1,000 cwt.	1,000 cwt.	1,000 cwt.	1,000 cwt.
Herring	3,033	3,255	111	6,399
Cod	2,045	518	18	2,581
Haddock	2,037	740	4	2,781
Plaice and				
Soles	784	50	12	846
Whiting	321	151	16	488
Mackerel	236	26	39	301
Other kinds	3,059	678	34	3,771
	11,515	5,418	234	17,167

35. The fish caught in England and Wales was distributed as follows:

	1,000 cwt.
East Coast	8,710
South Coast	664
West Coast	2,140

Express the above figures graphically and explain why the North Sea is one of the three great fishing grounds of the world.

***36.** Scotland furnishes about one-third of the total output of fish, whereas the share produced by Ireland is small. Suggest reasons for the difference.

37. Fig. 136 shows the chief fishing ports. Note their position relative to the densely peopled areas and suggest reasons why fish curing is far more important in Scotland than in England.

E. 38. Write an essay on the life of a fisherman.

CHAPTER XVI

MINERALS AND MANUFACTURES

1. **M**OST of the useful minerals of the world have been formed deep under the surface of the earth, and are usually found in the older rock formations. Coal, however, was formed at the surface, but afterwards it was compressed and hardened by great thicknesses of younger rocks which were deposited over it.

Examine Fig. 18 and Fig. 92 and describe the processes which have made the minerals in the older rocks accessible to man.

2. Fig. 86 shows the distribution of the chief minerals of the British Isles. Trace the outline of this figure and mark upon your tracing (a) a line to show the direction of the oolitic limestone ridge, (b) the coalfields, (c) the symbols showing the distribution of minerals.

How do you account for the fact that most of our minerals lie to the west of the oolitic ridge?

3. Compare your tracing with the relief map in your atlas. Notice that the coalfields lie on the margins of highland regions. Give reasons for this.

OUTPUT OF BRITISH COALFIELDS

1923 . . . 276,000,000 tons raised

	Coal raised. Million Tons.
York, Derby, and Nottingham . . .	78·1
South Wales and Monmouth . . .	54·3
Northumberland and Durham . . .	52·5
Lanark and Stirling . . .	20·5
Lancashire and Cheshire . . .	20·2
Fifeshire (and Clackmannan) . . .	8·8
South Staffordshire (and Cannock Chase) . . .	7·6
North Staffordshire . . .	6·6
Warwickshire . . .	5·3
Ayrshire . . .	4·7
Edinburgh . . .	4·5
North Wales . . .	3·4
Leicester . . .	3·3
Cumberland . . .	2·1
Forest of Dean . . .	1·4
Bristol . . .	1·4
Shropshire . . .	·8
Kent . . .	·5
	276·0

4. The quantity of coal raised in Britain increased from 64,000,000 tons in 1855 to 287,000,000 in 1913. Draw a circular diagram to show, comparatively, the present output of the several coalfields.

5. About 20 per cent. of the coal produced is exported, coal accounting for about 60 per cent. of total **weight** of our exports.

On the map drawn in answer to question 2 mark the coal ports named in the table below:

CHIEF COAL PORTS

Port.	Percent- age of Coal exported.	Port.	Percent- age of Coal exported.
Cardiff . .	25	Leith . .	3
Tyne Ports .	19	Hartlepool .	3
Swansea . .	8	Burntisland .	3
Newport . .	7	Grimsby . .	3
Sunderland .	5	Other ports	
Glasgow . .	4	(Ayr, Mary- port, White- haven, &c.)	6
Hull . .	4		
Blyth . .	4		
Port Talbot .	3		
Methil . .	3		

6. What percentage of the coal exported is obtained from the South Wales and the Northumberland and Durham coalfields respectively? Explain fully why these coalfields account for such a large proportion of the coal exported.

F. 7. Translate

La houille anglaise a rendu au pays un service de premier ordre: c'est d'assurer aux navires qui viennent débarquer leurs marchandises dans les ports anglais un fret de retour.

On sait de quel mal souffrent presque tous les ports de l'Europe. Bien des navires, qui leur apportent des marchandises, ne trouvent à remporter que des produits fabriqués qui constituent une cargaison moins lourde; ils repartent à moitié vides. Pour les ports anglais, rien de pareil. Tous se trouvent à portée de quelque bassin houiller. Tout navire

qui y débarque sa cargaison peut, pour le retour, compléter son chargement en prenant dans sa cale un stock de charbon. Ainsi, de ses deux voyages d'aller et de retour, aucun n'aura été inutile. C'est là une des forces des ports anglais, un des avantages de la marine marchande britannique ; il est dû à l'abondance et à la situation des bassins houillers de la Grande Bretagne.

8. All British coalfields are near the sea and in many cases iron occurs with the coal or near it. How has Britain benefited from these two facts ?

9. Study the following table and draw a diagram to show the percentage of iron ore obtained from (a) the coal measures, (b) oolitic limestone ridge, (c) the limestone rim of the Lake District :

11. Examine the geological map and state in which rock formation salt is usually found. Name some industries which use large quantities of salt.

12. Express, in the form of a diagram, the statistics given below :

OUTPUT OF SALT

County.	Tons.	Chief Centres.
Cheshire .	1,500,000	Northwich, Winsford, Middlewich
Lancashire .	300,000	Fleetwood
Durham .	200,000	Port Clarence
Worcester .	150,000	Droitwich

DISTRIBUTION OF IRON ORE RAISED IN BRITISH ISLES

	Percentage of Total raised.	Chief seats of Iron Smelting.
1. <i>Coal Measure Ores</i>		
South Stafford	4	Black Country : West Bromwich, Wolverhampton, Dudley Coatbridge, Airdrie, Falkirk
Lanark	4	
2. <i>Jurassic Ores</i>		
Cleveland	30	Middlesbro', Stockton Scunthorpe, Sheffield, Rotherham Kettering, Wellingborough Black Country Black Country
Lincoln	19	
Northants	16	
Leicester	7	
Oxford	3	
3. Furness and Cumberland . .	11	Barrow, Workington
4. Ireland (Glenarm, Antrim) .	1	Belfast
Imported Ores (Spanish) . .		Merthyr, Cardiff, Newport, Furness

Most of the ore imported into this country comes from Spain and Sweden, and amounts to one-half of the quantity raised in Britain. The Spanish ore goes chiefly to South Wales, Barrow, and Workington, the Swedish ore to the Tyne, Middlesbro', and Sheffield.

*10. Only small quantities of lead, zinc, tin, and copper are now obtained in Britain. The bulk of the supply of these metals comes from abroad. With the help of the information given on the geological map and in *Whitaker's Almanack*, draw up a table to show (a) the distribution of these metals in Britain, (b) the chief sources of foreign supply.

C. 13. Of what elements is common salt formed ? Name some important chemicals which contain one of these elements. Describe some of the uses made of these chemicals.

C. 14. What is coal tar ? Name and describe the uses made of the products which are directly or indirectly derived from coal tar.

15. Write a brief account of the chief mineral resources of the British Isles.

MANUFACTURES

16. Coal and iron form the basis of our manufacturing industries. Converted into steel,

iron is employed in the construction of an infinite variety of useful commodities.

The chief iron-smelting centres are given in question 9. What materials (besides coal and iron ore) are required for smelting? How are the smelting centres situated with regard to all the materials used?

17. Iron furnishes the basic material for a large number of industries, among which the following are the most important.

Industry.	Chief Centres.
Shipbuilding . . .	Clyde, Tyne, Wear and Tees ports, Belfast, Barrow, Hull, Birkenhead
Agricultural Machinery	Lincoln, Grantham, Peterborough, Norwich, Ipswich, Gainsborough
Cotton Machinery . .	Manchester, Oldham, Bolton, Bury, Glasgow
Woollen Machinery . .	Leeds, Bradford, Keighley
Electrical Machinery	Manchester, Birmingham, London, Rugby, Glasgow
Motor Vehicles . . .	Coventry, London, Birmingham, Manchester
Locomotives	Crewe, Swindon, Derby, Doncaster
Rails	Merthyr Tydvil, Sheffield, Darlington
Tinplate	Swansea, Llanelli
Hardware	Birmingham district

On an outline map mark the position of the above towns. Show by means of the symbols used in the Figs. in Chapter XI, the industry carried on at each centre. (Note.—A square □ represents a metal industry.)

18. Read question 26, Chapter VIII, and explain why most of the metal industries of Britain lie on a coalfield.

19. The cost of transport (whether of coal and raw materials to a factory or of the finished article to the market) is so important a factor in deciding the localisation of an industry, that it is important to point out that the actual distance of a factory from coal, raw materials, or market is immaterial so long as the cost of transport is low. It is the **effective** and not the actual distance that matters.

Take each of the industries named in question

17, and describe as fully as you can the conditions which favoured the development of the industry at the centres named.

20. The textile industries furnish the materials for nearly all our clothing and for many household articles. The principal industries of this group are based on cotton, wool, flax, jute, hemp, and silk.

From the data given below, draw a map to show the chief cotton manufacturing centres. Use the symbols employed on the figures found in Chapter XI:

Industry.	Chief Centres.
<i>Cottons</i>	
Cotton Weaving	Blackburn, Preston, Burnley, Accrington
Cotton Spinning	Oldham, Bolton, Stockport, Rochdale, Bury
Lace	Nottingham, Derby
Thread	Paisley
Hosiery	Nottingham, Derby

As far as you can, account for the distribution of the industries named.

21. How do you account for the predominance of Lancashire in the cotton industry?

22. From the data given below draw a map to show the chief woollen manufacturing centres. Use the symbols employed in the Figs. in Chapters XI and XII for this and similar answers in future.

Industry.	Chief Centres.
<i>Woollens</i>	
Blankets	Halifax, Witney
Flannel	Rochdale, Halifax, Dewsbury
Worsted	Bradford
Tweed	Hawick, Galashiels, Huddersfield, Stirling
Carpets	Halifax, Kidderminster, Wilton, Kilmarnock
Hosiery	Leicester, Hawick, Dumfries
Ready-mades	Leeds
Felt Hats	Stockport, Denton

Woollen goods are also made at several small towns in Wales, at Stroud, Bradford-on-Avon, and Trowbridge, and in Harris and Donegal.

23. How do you account for the wide distribution of the woollen industry?

24. What conditions specially favour the production of woollen goods in Yorkshire?

25. The silk industry is relatively unimportant, for out of a total of over 1,000,000 textile workers only about 29,000 are engaged in the silk industry. The chief centres are Bradford, Chesterfield, Derby, Leek, Macclesfield, and London. Silk thread is made at Leek, velvets at Bradford, and umbrella silk in London.

Mark these centres on the last map drawn by you.

Artificial silk is a recent production, and is largely made at Coventry and Flint. What are the materials used in its manufacture?

26. From the data given below draw a map to show the chief centres of the linen, hemp, and jute manufactures:

Industry.	Chief Centres.
Fine Linen .	Belfast, Lisburn, Londonderry, Lurgan, Larne
Table Linen	Dunfermline, Barnsley
Canvas .	Dundee, Arbroath, Barnsley
Linoleum .	Kirkcaldy
Sailcloth .	Dundee, Sunderland, Stockton, Hull

27. Suggest reasons why (a) linen is distinctly an Irish industry, (b) Dundee is the chief centre of jute manufactures, (c) most of the sailcloth is manufactured on the east coast of Britain.

28. From the data given below draw a map to show the chief centres of the several industries named in the table:

Industry	Chief Centres.
I.	
Leather	Leeds, Runcorn, London, Stafford
Boots and Shoes	Northampton, Kettering, Leicester, Leeds
Gloves	Worcester, Taunton, Yeovil
II.	
Soap	Glasgow, Birkenhead (Port Sunlight), London, Bristol, Leeds, Warrington
Paper	Counties of Hertford, Buckingham, Kent, Derby, Edinburgh
Oil-cake	Hull, Belfast
Hats (straw)	Luton, Bedford, Dunstable
Furniture	London, High Wycombe

Industry.	Chief Centres.
III.	
Chemicals .	Widnes, St. Helens, New-castle area, Northwich, Swansea, Glasgow
Glass . . .	St. Helens, Stourbridge
Earthenware .	Burslem, Stoke, Hanley
Porcelain .	Worcester, Derby, Stoke

Note.—The symbols used for the industries named above are equilateral triangles arranged thus Δ , ∇ , \triangleright . If the chief material used in the industry is derived from the animal kingdom Δ (two strokes of the letter A) is used, if from the vegetable kingdom ∇ (two strokes of the letter V), and if from the mineral kingdom \triangleright (the first two strokes of the letter M). You should reserve a page of your notebook for a classified arrangement of the symbols used in the sketch maps, and you are recommended to use these symbols in the sketch maps which you draw.

29. Describe the conditions which favour the production of (a) boots and shoes, (b) soap, (c) chemicals, (d) earthenware, at the centres named in the table in question 28.

30. From the data given below draw a map to show the distribution of the chief centres occupied in industries connected with tobacco, food, and drink:

Industry.	Chief Centres.
Tobacco	Bristol, Glasgow, London, Liverpool
Flour milling	Liverpool, Cardiff, London, Edinburgh
Sugar refining	Liverpool, Greenock
Jam	London, Liverpool, Dundee, Cambridge
Biscuits	Reading, London, Liverpool, Edinburgh, Dublin
Breweries	London, Burton, Edinburgh, Liverpool, Warrington, Dublin
Distilleries	Edinburgh, Dublin, Falkirk, Campbeltown

Suggest reasons for the localisation of each of the above industries.

31. With the help of exercises 16 to 30 draw

up a table to show the chief industries of the several coalfields of Britain.

32. Write an essay on the geographical factors which helped to determine the localisation of different industries in Britain (a) before, (b) after the industrial revolution.

F. 33. Translate :

Un caractère essentiel des industries britanniques, c'est leur concentration et leur spécialisation. Une même variété de production anime toute une ville et dans un rayon peu étendu se répartissent toutes les subdivisions d'une même industrie, chaque fabrique exécutant telle ou

telle partie du travail total. Il en résulte que les industriels qui livrent la marchandise achevée trouvent tout auprès d'eux les matières dégrossies, et évitent ainsi bien des pertes de temps et des frais de transport. Ajoutons qu'il n'est pas de point où l'on se trouve loin de la mer qui amène les matières premières, loin de la houille qui assure le travail, et l'on reconnaîtra quelle situation privilégiée la nature et l'homme ont faite à l'industrie britannique. Rarement trouve-t-on, au même degré, réunies, sur un étroit espace, les facilités de travail, d'approvisionnement, et d'expédition.

CHAPTER XVII

COMMUNICATIONS, TRADE, POPULATION

1. **T**HE great development of industry and commerce that marked the end of the eighteenth century would have been seriously hindered if Britain had had to rely solely on roads for transport. The opening of the Bridgewater Canal marked the beginning of an era of canal building, and in less than fifty years most of the chief industrial areas were linked up by a system of canals.

Fig. 133 shows the chief canals of the British Isles. Suggest reasons for the close network of canals in the Birmingham area.

2. How many canals cross the Pennines? Draw a large sketch map to show the route followed by each. Measure the length of the Leeds and Liverpool canal. What is the distance along the shortest railway route between these two places?

*3. What are the chief drawbacks to the canals built in the latter half of the eighteenth century? Do you think they can be remedied?

4. Name the ship canals of Britain and state where and why each was constructed.

5. Draw a large sketch map of the route followed by the Manchester Ship Canal. How has Manchester benefited by the construction of the canal?

6. Although canals supplied the means of transport which enabled the steam engine to effect a revolution in industrial methods, they failed to keep pace with the growing demand for transport facilities. Many of the chief canals were blocked with goods, and charges were very high, but just as canals relieved the situation at the end of the eighteenth century, railways came to the rescue at the beginning of the nineteenth. Since then railways have become the chief means of transport in the country.

The course of sections of most of the important

railways has already been traced by you in earlier exercises. We must now link up these sections. Name the four great companies which control the railways of Great Britain and the industrial areas served by each railway group.

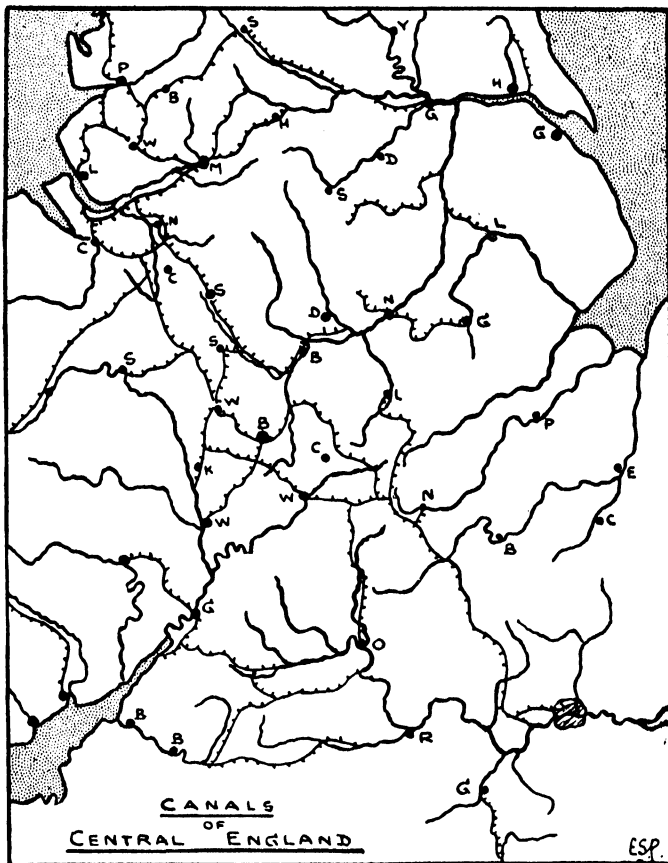


FIG 133.

7. With the help of a railway guide and of Fig. 134, draw diagrams or sketch maps to show the main long-distance routes from London. Mark on your maps the chief stopping-places on each route. In the case of each route state over what kind of country a traveller would pass and what kind of industries he would observe

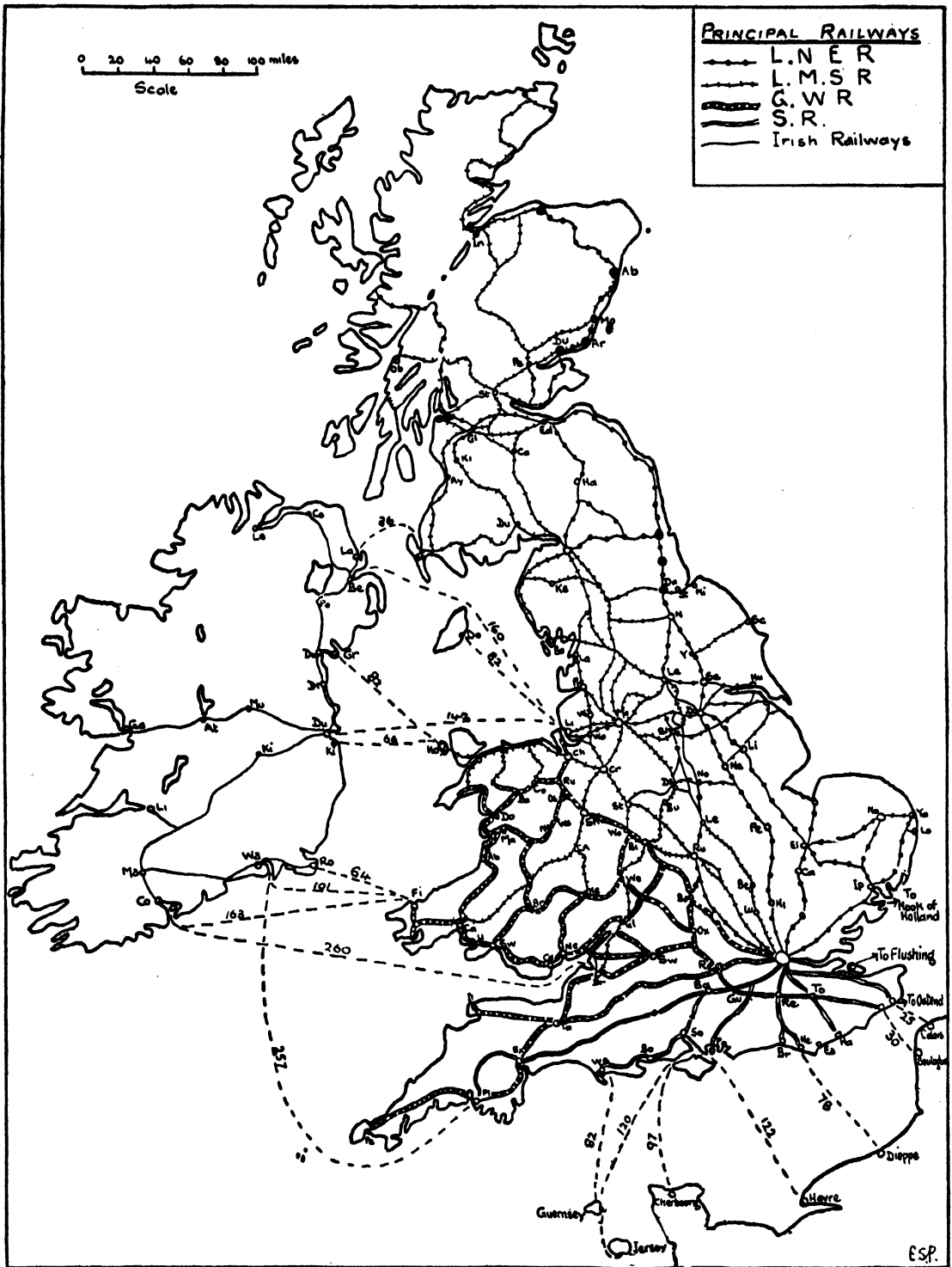


FIG. 134.

in the towns and in the rural districts on the way.

8. Draw a large scale map of the Thames Valley from Reading to the sea. Show on the map the Chiltern Hills and the North Downs, marking very carefully the railways which cross them, the gaps which the railways utilise, and the towns which control the gaps.

9. Draw sketch maps to show (a) the railway routes across the Pennines, (b) the chief routes from Birmingham to London, Liverpool, Hull, Bristol, and Southampton respectively.

10. Two mechanical inventions have brought much traffic back to the road again. The first is the petrol engine, and the second the high-pressure steam lorry. Compare the advantages and disadvantages of sending goods by river, by canal, by rail, and by road respectively, taking into account (a) kind of goods, (b) safety, (c) speed, (d) final cost to consumer.

11. A large part of the trade between different parts of the British Isles is carried on by sea. Draw a sketch map to show the routes between Great Britain and Ireland (Fig. 134). State and account for the character of the traffic along each of the routes marked on your map.

12. Draw a sketch map to show the routes (a) across the North Sea and English Channel (b) to the Channel Islands. State and comment upon the nature of the traffic along each of the routes marked upon your map.

TRADE

F. 13. Translate :

Ce qui précède peut nous donner déjà un aperçu du commerce britannique. Une population dense, vivant surtout de l'industrie, ne trouvant pas sur son sol les ressources alimentaires suffisantes, fait nécessairement appel, pour les besoins de sa vie quotidienne, aux pays d'agriculture et d'élevage.

L'importation de denrées alimentaires et l'exportation de produits fabriqués sont les traits dominants du commerce extérieur du Royaume-Uni.

L'activité des échanges doit beaucoup à la situation géographique des Îles Britanniques, placées à proximité des États riches et civilisés de l'Europe et sur la route maritime la plus fréquentée du monde, celle qui conduit aux États-Unis. L'histoire et la politique sont venues en aide à ces conditions naturelles ; par la possession d'un vaste empire colonial, où les gens de race anglaise sont nombreux, les Îles Britanniques disposent d'un champ d'action étendu et sont à proximité de tous les grands marchés du monde.

14. You have seen that in order to carry on

our manufacturing industries large quantities of raw materials and foodstuffs are imported annually from other lands. Details of the foreign trade may be found in *Whitaker's Almanack*.

The following figures are based upon the returns for recent years. Draw circular diagrams to show the relative values of the commodities, (a) imported, (b) exported.

Exports.		Imports.	
	Per-centage		Per-centage
Food and Drink	5	Food, Drink, Tobacco	50
Raw Materials (mostly coal)	13	Raw Materials	27
Manufactured Goods	80	Manufactured Goods	23
Other Articles	2		

State and comment upon the chief facts indicated by your diagram.

15. The nature and value of the principal articles which entered our chief ports in 1923 are given in Appendix II. The last column of Table A gives the total value of our imports of each of the articles named in the first column. The figures at the bottom of each of the other columns give the value of all articles entering the ports named in the table.

Study Table A of Appendix II carefully, and draw diagrams to represent graphically the import trade of each port. State and comment upon the most striking facts brought out by each diagram.

16. Table B of Appendix II gives similar information with regard to the principal articles exported from our chief ports.

Study Table B and draw diagrams to show the nature of the export trade of each port. State and comment upon the most striking facts brought out by each diagram.

17. A more detailed study of Appendix II will be made at a later stage. In the meantime, make note of any interesting facts which strike you as you examine the Tables.

18. With the aid of a newspaper make a list of steamship lines connecting the ports mentioned in Appendix II with distant ports.

19. "Britain has exceptional advantages for carrying on foreign trade." Write an essay on this subject, noting the advantages derived from the following: (a) geographical position, (b) nature of the coast-line, (c) nearness to sea on both sides, (d) tides, (e) climate, (f) abundance of coal and iron.

***20.** Describe the conditions necessary for the development of large modern seaports. Illustrate your answer by reference to the chief seaports of Britain.

POPULATION

21. The Industrial Revolution not only changed the method and means of industry, it changed the mode of life of millions of people. In 1801 three-quarters of the inhabitants of these islands lived in the country; in 1851 one-half; but at the present time four-fifths of the population are gathered together in towns.

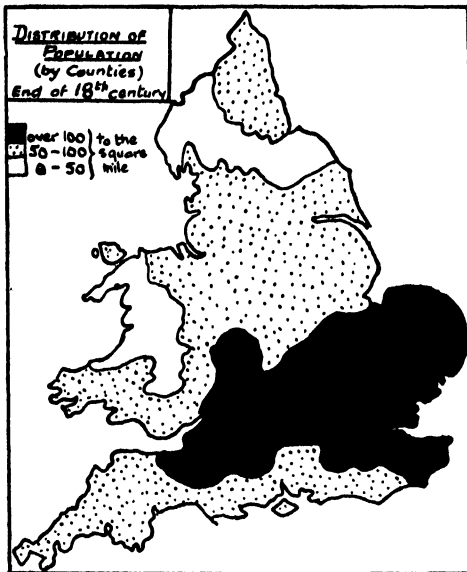


FIG. 135.

Fig. 135 shows the distribution of population at the end of the eighteenth century.

Describe and account for the distribution of population before the Industrial Revolution, taking into account the distribution of (a) the chief farming regions, (b) the iron mining and iron smelting districts, (c) the textile industries (on the banks of swift streams).

22. Fig. 136 shows the distribution of population at the present time. Compare this map with the map which shows the distribution of the coalfields. What do you notice?

23. Name the regions of dense population to the north and west of the oolitic limestone ridge which do not coincide with the coalfields. Suggest reasons for the density of population in those regions.

24. Account for the fact that there are but few areas of dense population to the south-east of the oolitic limestone ridge.

25. Explain fully why London is the largest city in the world, and state how London has affected the density of population in the neighbouring counties.

26. Name the densely peopled areas which lie south of the Thames and the Bristol Avon, and account for the density of population in each case.

27. In Ireland the population is more or less evenly distributed. Give reasons for this. Account for the greater density around Belfast and Dublin.

28. Compare the population map with the relief map in your atlas. Name the regions which have the sparsest population.

TOWNS

29. Read question 49, Chapter VIII, and your answer to it.

With the help of your atlas draw up a table of towns in the British Isles occupying the positions mentioned in the question referred to.

30. Discover towns in the British Isles situated originally in one or other of the following positions:

- On an island in a marshy region.
- On the inner bend of a river loop.
- At the foot of a cliff or hillock overlooking a river.
- Where a river could be forded.
- At the lowest point where a river was bridged.

In each case explain why the site was chosen.

31. Name some towns which were originally ports but are no longer so. Give reasons for the decay of each port you mention. Name also the port which has superseded it, and why it has done so.

F. 32. Translate:

Londres est à l'endroit où la route venue du continent, à travers le Kent, entre les marais de la Tamise et les forêts du Weald, débouche sur les bords du fleuve, à l'origine de l'estuaire. Le London Bridge est le cœur de Londres et en a été la raison d'être. En aval, en effet, sur une rive comme sur l'autre, sont des terres plates que la marée changeait en un bras de mer, et où, à mar basse, la Tamise coulait indécise à travers de véritables marécages. Londres se plaça sur un sol sec, ferme, à l'ouest et au nord de ces marais. Une fois au nord du pont, le trafic pouvait librement se diriger suivant l'éventail de routes qui conduisait vers le nord-est dans l'Angleterre orientale, vers le nord en Écosse, vers le nord-ouest à Chester et en Irlande, vers l'ouest à Bristol, vers le sud-ouest à Southampton.

Draw a full-page map to illustrate the above statement.

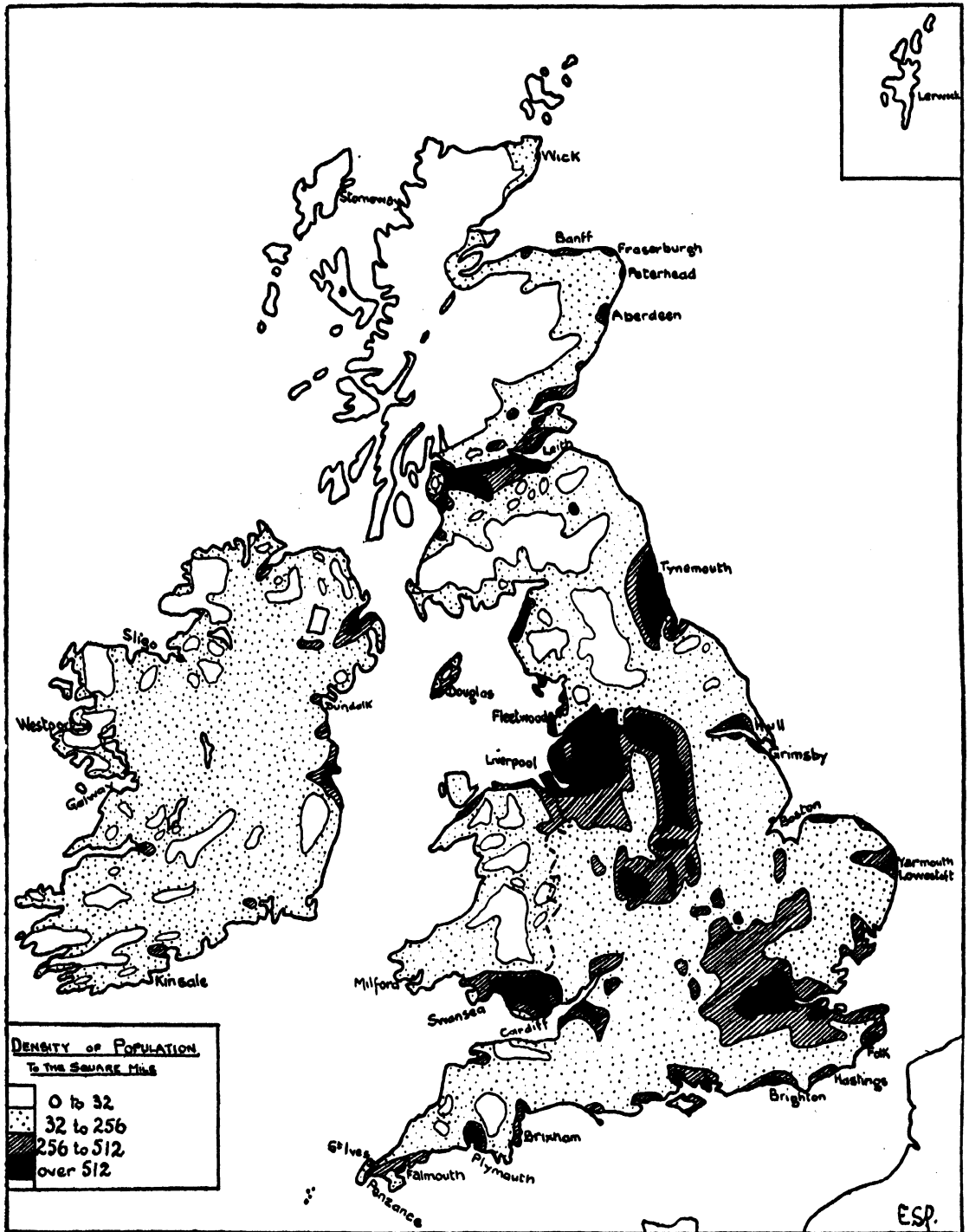


FIG. 136

CHAPTER XVIII

REVISION EXERCISES

1. **H**ighlands of Scotland (Fig. 89). With the help of your atlas, your geography book, and your worked exercises, write an orderly summary of the geography of the Highlands of Scotland.
2. The winter nights in the north of Scotland are very long. Explain why this is so.
3. Account fully for the fact that there are no very large ports in the north of Scotland. Why is Aberdeen the largest port of this area?
4. Most of the people of the north of Scotland live on the eastern coastal sill. Suggest reasons for this.
5. Show to what extent the life and occupations of the crofters of the Highland valleys may be regarded as being the result of the geographical conditions of the region in which they live.
6. **Central Lowlands of Scotland** (Fig. 90). Write an orderly summary of the geography of the Central Lowlands of Scotland.
7. What is meant by the "Highland Line"? Describe its position and name the chief rivers which flow across it. In what way is this line important?
8. Two-thirds of the people of Scotland live in the Central Lowlands. Suggest reasons for this. Account as fully as you can for the fact that Glasgow is more than twice the size of Edinburgh.
9. Describe clearly the natural routes which converge on (a) Glasgow, (b) Edinburgh.
10. What use is made of the Scottish Highlands by the people of the Central Lowlands?
11. **Southern Uplands** (Fig. 91). Write a summary of the main facts of the geography of the Southern Uplands region.
12. Describe and give reasons for the type of farming which is carried on in the lowlands of Galloway.
13. What do you mean by the "Border Country"? To what extent does geography account for the history of this area?
14. Account for the rise and the subsequent development of the woollen industry in the Tweed valley. Name the chief centres.
15. **North-East England** (Fig. 94). Write a summary of the main facts of the geography of the north-east of England.
16. Suggest reasons why the Tyne region has specialised in the shipbuilding rather than in the woollen industry.
17. North, south, and west of the north-eastern coalfield are to be found areas of sparse population. Name these areas and account for the sparseness of the population in the areas you name.
18. In the north-east of England there are three important groups of towns. Show these groups on a sketch map and indicate the industrial characteristics of the three groups.
19. **Cumberland and North Lancashire** (Fig. 96). Write an orderly summary of the geography of the north-west of England.
20. Describe the scenery of the Lake District. Explain why so many of the lakes of this area are "ribbon" lakes.
21. Compare and contrast the climate of the Lake District with that of the north-eastern coalfield. Account for the differences.
22. What is meant by "industrial inertia"? Illustrate your answer by reference to the pencil industry of Keswick. What other examples are known to you? Explain the rise of, and present means of supporting, each industry you name.
23. Sheep rearing and catering for visitors are the chief industries of the Lake District. Give reasons for this.
24. Suggest reasons for the development of important steel and shipbuilding industries at Barrow.
25. **South Lancashire, Cheshire, and North Staffordshire** (Fig. 95). Write an orderly summary of the geography of South Lancashire, Cheshire, and North Staffordshire.
26. The cotton towns of Lancashire lie on the margins of the uplands. Why was this position chosen?
27. The cotton industry of Lancashire has helped the development of other industries in the county. Name these industries and give other factors which favoured their development.
28. What reasons can you give for the fact that market gardening and dairy farming are important industries on the Lancashire and Cheshire plain?

29. Discuss the suitability of Manchester as a business centre for the Lancashire cotton towns.

30. Account for the fact that Liverpool has superseded Chester as the chief port of this area.

31. Why is it more important to have a port near for importing raw material and food than for exporting the manufactured articles?

32. Name the three most important minerals used in the pottery industry. How is Stoke situated with regard to each of them? Account for the rise of this industry in the "Potteries."

33. Humber Basin (Fig. 107). Write an orderly summary of the geography of the Humber Basin.

34. Draw a sketch map to show the main lines of communication across the Pennines? Why are these more numerous in the southern half of the Pennines? Explain why the Aire Gap is more important than Glenmore.

35. Describe and account for the rise and subsequent development of the woollen industry in the West Riding of Yorkshire. How is it that Lancashire specialises in cottons and Yorkshire in woollens?

36. What conditions favoured the rise of the cutlery industry at Sheffield? What are the chief reasons for the importance of this industry at the present time?

37. Compare Hull and Liverpool as ports for the industrial area of Yorkshire.

38. Glasgow, Edinburgh, Liverpool, Hull, Bristol, and London have developed industries which are typical of large ports. Comment upon this statement.

39. Describe and account for the special industries of Nottingham and of Derby.

E. 40. Compare and contrast the life of a farmer in the East Riding with that of an industrial worker in the West Riding of Yorkshire.

41. Wales (Figs. 97 and 98). Write an orderly summary of the main facts of the geography of Wales.

42. Compare the Snowdon District and the Lake District in as many ways as possible.

43. Give some account of the mean annual distribution of rainfall in Wales and point out any important results which follow this distribution.

44. What facts in the geography of Wales have had most effect on the history of the country? Show how these have acted.

45. Describe the route (a) from Chester to Holyhead, (b) from Newport to Fishguard. Show by means of a diagram or sketch map

why there is no direct railway route from Bangor to South Wales.

46. Compare and contrast South Lancashire and South Wales as regions in which a cotton industry might be developed.

47. How is it that, unlike the Clyde and Tyne areas, the South Wales area has not developed a great shipbuilding industry?

48. Trace the rise and decay of the iron industry of the Ruabon District.

49. Name the metal industries of South Wales. What conditions favoured the rise and subsequent development of the industries you name.

50. Midland Plain (Fig. 100). Write an orderly summary of the geography of the Midland Plain.

51. Describe the characteristic work of a farmer in (a) Herefordshire, (b) Vale of Evesham. What conditions favour the work in the regions named.

52. What is meant by "blackband ore"? How did the presence of this ore help the development of the iron industry in the "Black Country"?

53. Give a reasoned account of the industries of the Black Country. What effect has the position of this area upon the type of industry carried on there?

54. Do you consider Birmingham well placed for carrying on trade (a) with other countries, (b) with other parts of Britain.

55. Give a reasoned account of the industries of Burton, Leicester, and Coventry.

56. Lower Severn and Bristol Avon (Fig. 112). Write a summary of the geography of the Lower Severn and Bristol Avon regions.

57. Explain why Gloucester has not developed into a great seaport. What are the conditions which determine the site and growth of large modern seaports?

58. What are "West of England" goods? In what towns are they made? What were the conditions which encouraged the rise of the woollen industry in the towns you name?

59. South-Western Peninsula (Fig. 99). Write a summary of the geography of the south-western peninsula.

60. Fishing is an important industry in Cornwall and Devon. Suggest reasons for this.

61. Glasgow and Plymouth are on the same meridian, yet the time between sunrise and sunset is longer in Glasgow than in Plymouth on the 21st of June. How do you explain this?

62. Explain why the tin ore and the china clay of this region are not converted into useful articles locally.

63. Plymouth is the only town in the south-

west peninsula with a population of over 100,000. Account for its importance.

64. Describe the different types of scenery which attract visitors to the Cornwall and Devon peninsula.

65. Wash Basin and East Anglia (Fig. 109). Write a summary of the geography of the Wash Basin and of East Anglia.

66. What are the chief geographical contrasts between those parts of England which lie to the east and those parts which lie to the west of the oolitic limestone ridge?

67. Explain why the south-east of England was once the most important part of Britain, but, except for London, is such no longer.

68. Potatoes and fruit are important crops of the Fenlands. What conditions favour their growth?

69. What are the factors which enable wheat to be grown profitably in East Anglia?

70. "Many East Anglian towns are bridge towns. The largest towns became important because of their position on the great main roads." Discuss and illustrate this statement.

71. Compare and contrast the climate of the Cornwall and Devon peninsula with that of the Wash Basin.

72. Account for the importance of the fishing industry at Grimsby and Yarmouth.

73. Thames Basin (Fig. 111). Write a summary of the main facts of the geography of the Thames Basin.

74. Draw a diagram or sketch map to show the use made by railways of the gaps in the Chiltern Hills and North Downs.

75. One of the greatest problems of a growing city is its water supply. Explain fully how the following cities have solved this problem: London, Glasgow, Liverpool, Manchester, Birmingham.

76. State and account for the characteristic work of a farmer in the immediate neighbourhood of London.

What is the Oxford Clay Vale? Describe its position and chief industries.

77. Describe briefly the course of the Thames from its source to the sea.

78. What geographical factors decided the site of London? Illustrate your answer by means of a diagram.

79. London has neither coal nor raw material and yet it has become a great industrial city. Suggest reasons for this.

80. The Weald Region (Fig. 114). Write a brief summary of the geography of the Wealden region.

81. Explain the meaning of wind gap, water gap, dry valley, transverse valley. Give any

three examples of gap towns and explain the importance of each.

82. Why is Kent often called the Garden of England. Describe a journey across the county from Dover to London.

83. Which are the "Cinque Ports"? Discuss their past and present importance.

84. At one time the Wealden Region was of much greater economic importance than it is to-day. Explain why, and point out the conditions which have brought about the change.

85. Examine and describe the sites of Canterbury, Chatham, Dover.

86. Hampshire Basin (Fig. 115). Write a summary of the geography of the Hampshire Basin.

87. To what factors do you ascribe the growth and importance of Bournemouth, Southampton, Portsmouth.

88. Write notes on (a) the Isle of Man, (b) the Channel Islands, (c) the Scilly Isles, stating briefly in what ways each of them is of value to Britain.

89. Ireland (Fig. 116). Write an orderly summary of the geography of Ireland.

90. Account for the existence of so many lakes and bogs in the Central Plain of Ireland.

91. In spite of many natural advantages the western parts of Ireland are economically the least important. Discuss this statement.

92. Compare the life of a Donegal peasant with that of a peasant of the Hebrides.

93. Give as many reasons as you can to explain why Ireland has not become a great manufacturing country.

94. Give an account of the formation of peat. Why is peat of great importance in Ireland?

95. State the geographical conditions which favour the dairy farming industry in Ireland. From which ports is the dairy produce sent out? Which ports in England receive most of it?

96. Describe and account for the economic contrasts between Ulster and the rest of Ireland.

97. Contrast the Central Plain of Ireland with the Midland Valley of Scotland in as many respects as possible, giving reasons for the differences where you can.

GENERAL

98. What and where are the limestone scarps and the clay vales of England? Describe the position and characteristics of each.

99. Contrast the climate of Britain with that of New England.

100. Name the staple industries of Britain, and, where you can, explain their distribution.

E. 101. Write a short essay on transport, dealing with its influence on the increase, distribution, occupations, and home-life of the British people.

102. Compare and contrast the distribution of population in Scotland with that in England. Account fully for similarities and differences.

103. What inferences as to the geography of inland Britain might reasonably be made as a result of a coasting voyage from Glasgow to Southampton, via Stornoway, Aberdeen, Hull, and London.

104. Write a reasoned account of the geography of your own district.

APPENDIX I AGRICULTURAL STATISTICS

County.	Area in Acres.	Population.	Mountain and Heath Pasture.	Woods.	Permanent Pasture.	Arable Land.	Wheat.	Barley.	Oats.	Potatoes.	Turnips.	Other Crops.	Cattle.	Sheep.	Pigs.
Percentage of County Area.													Per 100 Acres		
ENGLAND :															
Bedford	301,829	206,478	0.0	4.2	36.6	47.9	12.5	4.2	6.6	2.9	1.4	20.3	11	23	8
Berkshire	460,846	294,807	2.3	8.2	37.5	38.3	8.0	4.7	7.2	0.4	3.3	14.7	11	28	4
Buckingham	477,308	236,209	0.5	7.5	55.2	27.5	6.6	2.9	5.4	0.4	1.5	10.7	17	34	5
Cambridge	551,496	129,594	0.3	1.2	21.2	67.8	18.0	10.2	8.0	6.0	2.2	23.4	9	24	10
Chester	647,646	1,025,423	1.9	3.8	52.4	29.8	3.0	0.3	8.6	3.7	1.4	12.8	28	12	10
Cornwall	866,320	320,559	8.2	3.8	33.9	36.7	2.2	3.7	8.0	0.5	1.5	20.8	25	41	11
Cumberland	961,544	273,037	31.8	3.7	38.2	19.6	0.1	0.1	7.1	0.8	2.9	8.6	17	61	1
Derby	646,412	714,539	5.5	4.1	62.6	12.6	2.2	0.8	3.1	0.4	1.4	4.7	22	20	4
Devon	1,666,797	709,488	10.1	5.3	42.9	29.2	2.5	2.3	7.4	0.6	2.7	13.7	18	48	6
Dorset	624,031	228,258	4.6	6.1	50.5	26.0	3.2	3.4	5.1	0.3	4.7	9.3	15	47	7
Durham	645,926	1,478,506	11.3	4.7	44.5	21.9	1.4	2.9	5.1	1.7	2.9	7.9	12	36	2
Essex	976,125	1,468,341	0.6	3.6	29.2	51.8	13.1	6.3	6.5	1.3	1.3	23.3	9	19	7
Gloucester	803,251	757,668	1.1	7.0	53.2	28.2	5.6	3.2	3.6	0.3	3.1	12.4	16	36	8
Hampshire	1,048,999	910,333	9.6	11.4	27.2	37.3	5.7	3.1	7.8	0.5	4.8	15.4	9	28	5
Hereford	536,071	113,118	2.4	7.9	60.1	23.4	3.9	3.7	3.8	0.2	2.7	9.1	19	57	4
Hertford	402,861	333,236	0.3	5.2	31.2	49.7	14.1	4.6	9.3	1.3	2.4	18.0	10	18	6
Huntingdon	233,221	54,748	0.1	2.1	37.6	52.1	14.2	9.0	3.9	4.0	0.7	20.3	12	29	8
Kent	972,940	1,141,867	1.2	10.0	44.8	30.5	4.9	3.1	4.5	1.6	1.5	14.9	9	89	6
Lancashire	1,830,048	4,928,359	8.2	3.5	46.6	20.0	2.5	0.3	5.4	3.9	0.6	7.3	19	26	6
Leicester	530,642	494,522	0.1	2.7	70.8	18.5	3.8	2.0	3.6	0.3	1.3	7.5	28	52	4
Lincoln	1,700,844	602,105	0.2	2.6	30.9	58.6	9.3	12.4	6.9	4.6	6.0	19.4	14	55	6
Middlesex	147,007	1,253,164	0.1	2.3	43.6	16.6	1.7	0.2	1.6	1.4	0.3	11.4	10	10	9
Monmouth	347,600	450,700	10.6	8.6	58.8	9.3	1.5	0.9	1.9	0.3	1.2	3.5	14	59	4
Norfolk	1,308,156	504,277	3.3	4.4	22.0	59.5	9.2	14.4	5.8	1.2	8.0	20.9	10	31	8
Northampton	636,123	302,430	0.1	4.5	58.9	29.3	6.8	6.1	3.1	0.4	2.2	10.7	21	55	4
Northumberland	1,284,189	746,138	37.1	4.4	40.4	14.2	0.3	2.5	3.2	0.4	2.6	5.2	10	85	1
Nottingham	536,697	641,134	0.3	5.8	41.4	40.6	6.3	6.4	6.6	1.2	5.0	15.1	16	32	4
Oxford	476,669	189,558	0.3	5.5	44.2	42.0	8.2	7.7	6.2	0.6	4.2	15.1	14	39	5
Rutland	97,087	18,368	0.0	3.9	56.5	32.9	3.9	10.9	3.0	0.2	4.7	10.2	20	82	2
Shropshire	856,623	242,959	4.6	6.2	57.1	26.5	3.1	5.8	4.0	0.6	3.7	9.3	23	52	3
Somerset	1,034,770	465,682	5.9	4.5	66.1	15.9	2.6	2.0	2.5	0.4	1.8	6.6	23	39	10
Stafford	734,920	1,329,325	1.1	5.3	59.9	20.7	3.0	2.2	4.1	1.6	2.1	7.7	23	26	5
Suffolk	945,411	399,988	3.2	4.2	20.7	59.5	11.7	12.6	5.0	0.4	4.3	25.5	8	31	7
Surrey	458,908	930,377	1.6	12.8	35.1	21.3	3.5	1.0	4.3	1.2	1.4	9.9	9	10	5
Sussex	928,735	728,001	2.6	13.7	45.3	24.8	5.1	0.8	5.9	0.4	1.8	10.8	13	41	4
Warwick	601,451	1,390,092	0.3	3.3	60.5	23.7	5.4	1.9	4.0	1.0	1.5	9.9	20	37	5
Westmorland	497,099	65,740	39.9	3.5	41.8	7.4	0.0	0.1	2.8	0.3	1.2	3.0	15	80	1
Wiltshire	861,366	292,213	5.1	6.0	51.6	30.4	6.0	2.9	5.4	0.3	3.8	12.0	14	46	6
Worcester	455,214	405,876	0.9	4.8	57.2	27.3	5.6	1.4	3.4	1.3	1.3	14.3	15	28	8
Yorks :															
East Riding	748,263	460,716	0.3	2.5	30.4	59.8	8.0	10.5	12.1	1.4	10.0	17.8	13	58	7
North Riding	1,357,433	456,312	22.4	4.2	39.7	23.8	1.4	5.5	5.2	0.8	3.6	7.3	13	51	3
West Riding	1,763,304	3,181,654	13.2	3.8	47.0	19.4	2.6	2.9	4.3	1.4	2.7	5.5	15	36	5
WALES :															
Anglesey	175,695	51,695	7.2	1.4	53.8	30.9	0.2	0.9	10.6	1.1	2.8	15.3	31	51	6
Brecon	466,347	61,257	48.1	3.1	34.9	7.8	0.5	0.7	2.4	0.2	0.9	3.1	8	104	1

AGRICULTURAL STATISTICS (*continued*)

County.	Area In Acres.	Population.	Mountain and Heath Pasture	Woods.	Permanent Pasture.	Arable Land.	Wheat.	Barley.	Oats.	Potatoes.	Turnips.	Other Crops	Cattle.	Sheep.	Pigs.
Percentage of County Area.													Per 100 Acres.		
WALES (<i>continued</i>)															
Cardigan	441,237	61,292	32.7	3.7	38.0	20.8	1.2	3.2	6.3	1.1	1.1	7.9	15	55	4
Carmarthen	586,152	175,069	11.7	4.1	62.0	12.8	1.1	1.9	4.2	0.5	0.7	4.4	20	45	5
Carnarvon	362,277	131,034	35.4	3.2	34.5	12.8	0.1	1.4	3.1	0.9	0.9	6.4	14	72	4
Denbigh	434,378	154,847	20.1	4.5	41.8	19.8	1.1	2.8	5.5	0.6	1.9	7.9	17	88	5
Flint	162,448	106,466	7.3	4.6	54.1	23.6	2.1	2.8	5.6	1.0	2.2	9.9	24	55	10
Glamorgan	514,999	1,252,710	24.8	5.0	41.3	9.4	0.7	1.0	2.0	0.3	1.1	4.3	11	58	3
Merioneth	418,475	45,430	46.6	3.8	29.6	6.2	0.1	0.9	2.1	0.3	0.4	2.4	9	103	1
Montgomery	505,738	51,317	33.8	5.1	40.4	13.6	1.5	1.4	3.8	0.3	1.2	5.4	15	88	4
Pembroke	392,384	92,056	11.0	2.6	55.3	23.0	0.6	4.4	7.0	0.6	1.5	8.9	23	35	7
Radnor	299,521	23,528	42.9	3.9	40.4	10.1	0.6	1.2	3.8	0.2	1.7	2.6	11	93	1
SCOTLAND:															
Aberdeen	1,261,521	300,980	12.7	8.4	2.9	46.8	0.0	1.8	14.7	0.1	6.8	23.4	14	17	1
Argyll	1,990,472	76,862	71.4	2.4	3.7	2.8	0.0	0.1	0.8	0.2	0.3	1.4	3	39	0
Ayr	724,251	299,254	45.4	3.6	23.6	20.1	0.1	0.1	5.8	1.3	1.0	11.8	15	48	2
Banff	403,053	57,293	13.7	7.1	2.6	37.0	0.0	2.0	12.0	0.5	5.3	17.2	11	16	1
Berwick	292,535	28,395	24.4	5.0	17.7	47.7	0.5	7.0	10.7	1.1	8.6	19.8	7	111	1
Bute	130,658	33,711	44.8	2.8	7.9	10.2	0.0	0.0	3.3	0.7	0.9	5.3	6	30	0
Caithness	438,833	28,284	48.0	0.3	6.3	19.1	0.0	0.2	7.2	0.3	2.8	8.6	5	29	0
Clackmannan	34,927	32,543	34.4	10.6	19.5	24.9	0.9	0.9	8.0	1.1	2.0	12.0	10	41	2
Dumbarton	156,927	150,868	49.3	5.5	15.8	15.0	0.5	0.0	4.4	1.5	0.8	7.8	9	46	1
Dumfries	686,302	75,365	55.8	4.4	17.3	19.5	0.0	0.1	6.0	0.6	2.5	10.3	10	80	1
Elgin	304,931	41,561	26.0	15.1	2.5	30.0	0.2	3.5	7.7	0.7	4.8	13.1	8	16	1
Fife	322,844	292,904	4.6	8.1	23.7	53.3	3.6	6.0	12.0	5.4	6.8	19.5	16	32	2
Forfar	559,037	270,950	31.3	5.7	5.1	39.2	1.8	4.7	8.8	3.4	5.6	14.9	10	28	1
Haddington	170,971	47,487	22.9	6.3	12.9	52.4	3.4	9.1	9.3	5.4	8.4	16.8	8	74	1
Inverness	2,695,094	82,446	54.3	5.4	2.3	3.2	0.0	0.2	1.1	0.2	0.4	1.3	2	18	0
Kincardine	244,482	41,779	17.2	11.5	4.4	44.3	0.3	5.0	11.1	1.7	6.7	19.5	11	20	1
Kinross	52,410	7,963	25.0	5.5	25.4	40.3	0.2	1.0	11.8	1.9	4.6	20.8	13	64	1
Kirkcudbright	575,832	37,156	59.6	3.4	16.8	16.1	0.0	0.0	4.4	0.3	1.9	9.5	10	66	2
Lanark	564,860	1,539,307	38.2	3.7	22.0	22.4	0.4	0.0	6.5	0.9	1.7	12.9	13	42	1
Linlithgow	76,861	83,966	5.1	6.4	31.1	43.3	3.0	3.0	12.7	3.5	4.2	16.9	16	25	2
Midlothian	234,325	506,378	26.0	5.2	19.1	33.6	2.7	2.4	8.5	3.1	4.2	12.7	8	78	4
Nairn	104,252	8,790	43.9	12.8	2.2	22.2	0.0	2.7	5.4	0.3	3.8	10.0	6	16	0
Orkney	240,847	24,103	22.0	0.0	7.1	37.7	0.0	1.6	13.8	1.1	5.8	15.4	13	15	1
Peebles	222,240	15,330	73.7	5.1	9.9	12.7	0.0	0.2	3.1	0.2	1.6	7.6	3	90	0
Perth	1,595,802	125,515	55.3	5.6	6.8	14.1	0.4	0.6	4.1	1.0	1.6	6.4	5	39	0
Renfrew	151,799	298,887	24.6	4.5	33.9	23.9	1.3	0.0	6.3	2.0	1.3	13.0	17	28	1
Ross and Cromarty															
Roxburgh	426,028	44,989	52.3	4.0	15.6	26.0	0.1	2.8	6.3	0.3	4.7	11.8	5	125	1
Selkirk	170,793	22,606	79.5	3.1	8.5	8.8	0.0	0.2	2.6	0.1	1.5	4.4	2	106	0
Shetland	352,319	25,520	89.0	0.0	6.7	4.0	0.0	0.3	2.0	0.7	0.4	0.6	8	76	0
Stirling	288,842	161,726	48.0	5.1	21.2	18.5	0.5	0.7	6.1	1.2	1.3	8.7	11	43	0
Sutherland	1,297,914	17,800	68.2	1.6	0.7	1.7	0.0	0.0	0.6	0.1	0.2	0.8	9	16	0
Wigton	311,984	30,782	34.5	0.3	14.5	35.5	0.0	0.2	9.8	0.4	4.6	20.0	18	36	5
IRELAND:															
Antrim	712,825	580,811	16.2	0.9	41.1	31.4	0.1	0.0	8.2	4.6	1.3	17.2	23	13	6
Armagh	312,773	120,291	2.3	1.1	44.9	43.3	0.2	0.0	12.1	6.1	2.1	22.8	30	7	6
Carlow	221,485	36,252	3.2	1.3	54.1	31.8	0.3	2.1	7.8	3.0	2.4	16.2	24	43	9
Cavan	467,025	91,173	3.6	1.2	53.2	30.2	0.1	0.0	6.2	4.5	0.5	18.9	28	3	9
Clare	788,337	104,232	10.7	1.2	57.2	19.5	0.1	0.1	1.3	2.1	0.6	15.3	26	13	4
Cork	1,843,716	392,104	11.2	1.4	50.0	24.7	0.3	0.9	5.8	2.3	2.0	13.4	27	12	7
Donegal	1,193,641	168,537	36.2	0.6	26.3	18.2	0.0	0.0	6.6	3.0	1.3	7.3	15	13	2
Down	613,628	204,303	6.0	2.1	42.6	39.7	0.5	0.0	14.7	6.9	2.5	15.1	25	17	5
Dublin	226,784	477,196	5.7	1.4	52.4	31.3	1.2	0.4	4.8	2.7	1.1	21.1	30	24	5

APPENDIX I

AGRICULTURAL STATISTICS (*continued*)

County.	Area in Acres.	Population.	Mountain and Heath Pasture.	Woods.	Permanent Pasture.	Arable Land.	Wheat.	Barley.	Oats.	Potatoes.	Turnips.	Other Crops.	Cattle.	Sheep.	Pigs.
Percentage of County Area.													Per 100 Acres.		
IRELAND (<i>contd.</i>):															
Fermanagh .	417,912	61,836	8.6	1.5	52.6	24.4	0.1	0.0	3.4	2.6	0.4	17.9	25	2	4
Galway .	1,467,850	182,224	17.8	1.6	42.7	15.7	0.2	0.2	2.8	2.5	0.8	9.2	14	43	4
Kerry .	1,161,752	159,691	25.2	1.2	43.6	14.9	0.1	0.1	1.9	1.8	0.5	10.5	25	10	5
Kildare .	418,645	66,627	0.1	1.6	62.4	23.7	0.3	2.9	3.7	1.2	2.1	13.5	26	28	3
Kilkenny .	509,458	74,962	2.5	1.9	60.3	28.3	0.3	3.2	5.1	2.1	2.0	15.6	30	17	5
King's .	493,263	56,832	2.3	1.4	47.6	23.5	0.0	3.4	3.4	2.3	1.8	12.6	18	14	5
Leitrim .	376,510	63,582	8.4	0.8	53.0	21.5	0.0	0.0	1.9	2.9	0.2	16.5	26	4	5
Limerick .	663,959	143,069	4.9	1.0	63.2	24.6	0.2	0.0	1.7	1.7	0.6	20.4	39	5	7
Londonderry .	515,269	140,545	18.1	0.9	37.1	33.1	0.2	0.1	12.6	5.5	2.3	12.4	21	13	5
Longford .	257,770	43,820	0.3	1.3	54.5	25.7	0.1	0.0	3.4	3.2	0.6	18.4	26	10	6
Louth .	202,181	63,665	4.7	1.7	44.5	40.3	0.2	6.2	9.8	4.4	4.1	15.6	25	21	7
Mayo .	1,333,356	192,177	27.3	0.7	33.9	13.9	0.1	0.0	2.9	2.8	0.5	7.6	16	21	5
Meath .	577,735	65,091	0.0	1.3	71.3	21.3	0.1	0.1	3.4	1.5	1.0	15.2	38	31	2
Monaghan .	318,990	71,455	0.7	1.3	51.4	35.6	0.1	0.3	11.9	5.5	1.7	16.1	28	4	9
Queen's .	424,838	54,629	4.5	2.3	51.2	31.0	0.1	5.4	4.0	2.8	2.7	16.0	22	12	6
Roscommon .	608,290	93,956	1.0	1.3	57.2	22.1	0.1	0.1	2.6	2.9	0.6	15.8	24	27	5
Sligo .	442,204	79,045	11.0	1.6	51.7	17.7	0.0	0.0	2.8	2.8	0.4	11.7	24	12	5
Tipperary .	1,051,304	152,433	6.7	2.3	57.6	24.3	0.1	1.9	3.1	1.9	1.7	15.6	32	17	6
Tyrone .	779,563	142,665	18.4	1.4	39.7	29.2	0.1	0.0	10.3	4.5	1.8	12.5	23	7	4
Waterford .	454,489	83,966	10.6	5.4	54.3	17.1	0.0	0.4	6.4	1.7	1.6	7.0	27	13	6
Westmeath .	434,665	59,986	0.0	0.1	64.7	19.1	0.0	0.1	2.6	1.8	0.8	13.8	28	25	3
Wexford .	580,950	102,273	1.6	1.1	54.9	33.4	0.8	6.0	7.6	2.7	3.6	12.7	25	29	10
Wicklow .	499,957	60,711	26.7	2.2	42.6	17.7	0.0	0.1	4.4	1.3	1.2	10.7	16	43	3
England .	32,389,114	36,678,530	7.6	5.3	43.3	32.0	5.1	4.5	5.5	1.3	3.1	12.5	15	42	6
Wales .	4,749,651	2,206,712	28.2	3.9	43.3	14.7	0.8	1.9	4.3	0.5	1.2	6.0	15	71	4
Scotland .	19,070,194	4,882,288	47.8	4.6	7.8	17.3	0.3	1.0	4.9	0.8	2.3	8.0	6	36	1
Ireland .	20,247,197	4,390,219	12.5	1.5	48.4	23.9	0.2	0.9	5.2	2.9	1.4	13.3	24	18	5

APPENDIX II

TABLE A

GENERAL IMPORTS, 1923 (£ MILLIONS)

	London.	Liverpool and Birkenhead.	Hull.	Bristol and Avonmouth.	Manchester and Ship Canal Ports.	Southampton.	Glasgow.	Tyne Ports.	Cardiff.	Leith.	Total Value of Articles Im- ported, 1923.
Wheat and Flour . . .	14.1	12.7	8.6	4.6	5.4	0.2	4.0	1.7	3.2	2.3	61.8
Maize	1.9	3.4	1.3	1.3	0.6	0.3	0.7	0.1	0.2	0.4	14.3
Beef	16.1	10.1	0.26	0.05	0.17	1.2	0.6	0.5	0.04	—	33.8
Mutton and Lamb . .	16.5	4.9	0.17	0.2	0.07	0.2	0.1	—	0.06	—	23.1
Bacon	3.9	8.5	2.2	0.6	0.16	1.3	0.2	3.7	0.03	0.3	38.2
Cheese	9.9	1.8	0.2	1.0	0.4	0.2	0.4	0.2	0.2	0.25	15.2
Butter	18.1	1.8	2.9	0.3	0.2	2.2	0.3	3.8	0.5	3.4	44.2
Sugar	16.8	11.2	2.0	1.0	1.1	0.2	0.6	0.8	0.3	1.0	41.2
Tea	31.4	0.16	0.6	—	1.7	—	0.07	—	—	0.03	33.5
Fruit and Nuts (Raw and Preserved) . . .	13.9	11.6	2.4	2.7	1.2	2.3	2.4	0.5	0.3	0.3	44.5
Eggs	6.1	2.1	1.0	—	0.2	0.6	0.9	0.9	—	1.2	16.9
Cocoa	1.3	1.6	0.02	0.07	—	—	0.01	—	—	—	3.0
Coffee	1.7	0.04	—	0.27	—	0.01	—	—	—	—	2.0
Raw Cotton	0.8	72.5	0.2	—	17.6	0.06	0.02	—	—	—	93.4
Raw Wool	23.9	6.2	11.6	—	0.8	3.4	0.08	—	—	0.05	46.7
Wood (Manuf. etc.) . .	14.5	5.5	3.7	0.7	3.3	0.5	2.0	1.7	2.6	0.6	52.3
Raw Rubber	10.5	1.5	—	—	0.01	—	—	—	—	—	12.3
Silk (mostly Manuf.) .	4.9	0.3	—	—	—	1.1	—	—	—	0.02	24.5
Oil-seeds and Oil-nuts	5.9	5.4	10.3	1.2	0.25	0.1	0.3	—	—	0.7	25.6
Hides and Skins . . .	3.6	3.7	0.4	0.17	0.05	1.0	0.2	—	—	0.1	9.7
Chemicals and Dyes . .	3.4	1.8	0.4	0.17	1.1	0.04	0.4	—	—	0.2	9.9
Flax, Hemp, Jute (Fibre)	2.6	0.6	0.1	—	—	—	0.3	—	—	0.3	10.1
Tin (Ore and Manuf.)	3.1	5.3	—	0.02	—	—	—	—	—	—	8.7
Copper (Ore and Manuf.)	1.1	3.9	—	0.6	1.4	0.7	0.06	—	—	—	11.5
Iron Ores	—	0.2	—	—	0.4	—	0.7	0.3	0.7	—	6.8
Totals (including all Imports)	384.51	243.77	65.28	30.26	55.95	33.44	28.19	20.02	11.57	17.95	979.44

APPENDIX II

TABLE B

EXPORTS OF NATIVE PRODUCE AND MANUFACTURE, 1923 (£ MILLIONS)

	London.	Liverpool.	Hull.	Bristol and Avonmouth.	Manchester.	Southampton.	Glasgow.	Tyne Ports	Cardiff.	Leith.	Total Value of British Exports, 1923.
Apparel (including Boots and Shoes) .	9.0	4.9	0.9	—	0.2	5.9	0.4	0.4	—	0.02	26.4
Chemicals, Dyes .	3.4	7.6	0.6	0.1	1.1	0.2	1.4	0.4	0.2	0.6	19.3
Coal and Coke .	0.9	1.8	6.8	0.01	0.7	—	2.2	22.5	24.6	1.9	109.9
Cotton Goods (all) .	11.2	105.7	7.0	—	22.1	8.4	8.5	1.3	0.06	0.8	179.4
Iron and Steel Manufactures .	5.4	24.0	1.7	3.0	1.6	0.5	8.0	0.5	1.0	0.3	76.2
Linen Goods (all) .	0.7	7.6	0.2	—	0.09	0.3	2.3	0.04	—	0.05	11.7
Machinery (including Electrical) .	6.6	19.9	1.7	0.08	4.8	0.8	6.2	0.2	0.04	0.6	44.5
Ships and Ship Machinery .	0.09	0.2	0.02	—	—	0.1	2.8	3.9	—	0.03	9.7
Woollen and Worsted Manuf. (all) .	13.7	26.8	4.1	0.01	1.5	3.0	1.6	0.8	—	0.2	64.0
Totals (including all Exports of British products) . . .	126.79	266.83	33.30	5.07	36.42	30.56	50.92	33.33	26.73	7.30	767.33

